

The Iron Age

A Review of the Hardware and Metal Trades.

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The Steel Bridge at St. Louis.

As we have already given in previous issues of *The Iron Age* detailed accounts of the foundations, masonry and superstructure of the great steel bridge which spans the Mississippi River at St. Louis, it is unnecessary at this time to publish a long descriptive article with the accompanying illustration, which shows the present condition of the work, and the methods employed by Captain Eads in constructing the superstructure. The following, however, which

of tubes, making, for the side arches 340 to the span, and 342 for the central one. The men are working now on the eastern half of the bridge, the other being in such a forward state that it has to be neglected until the rest of the work balances it. In this gigantic work the utmost thought of little things is imperatively needed. The moment that one tube is in place, the tube that balances it on the other side of the pier must be put into position. The strain upon the iron cables that support the tubes until they form a perfect

contract for the superstructure, were in a hurry to close the western arch, so the ice was used.

The workmen now thoroughly understand the handling of the tubes, and are putting them together on the eastern half at the rate of 24 a day. The frames, from which the long curves of tubing stand, are all inserted. These are called skewbacks, and are of wrought iron, forged in one piece of three tons—a very creditable specimen of the handiwork of Pittsburgh. The first tube, which is very short and stout, is screwed to this with

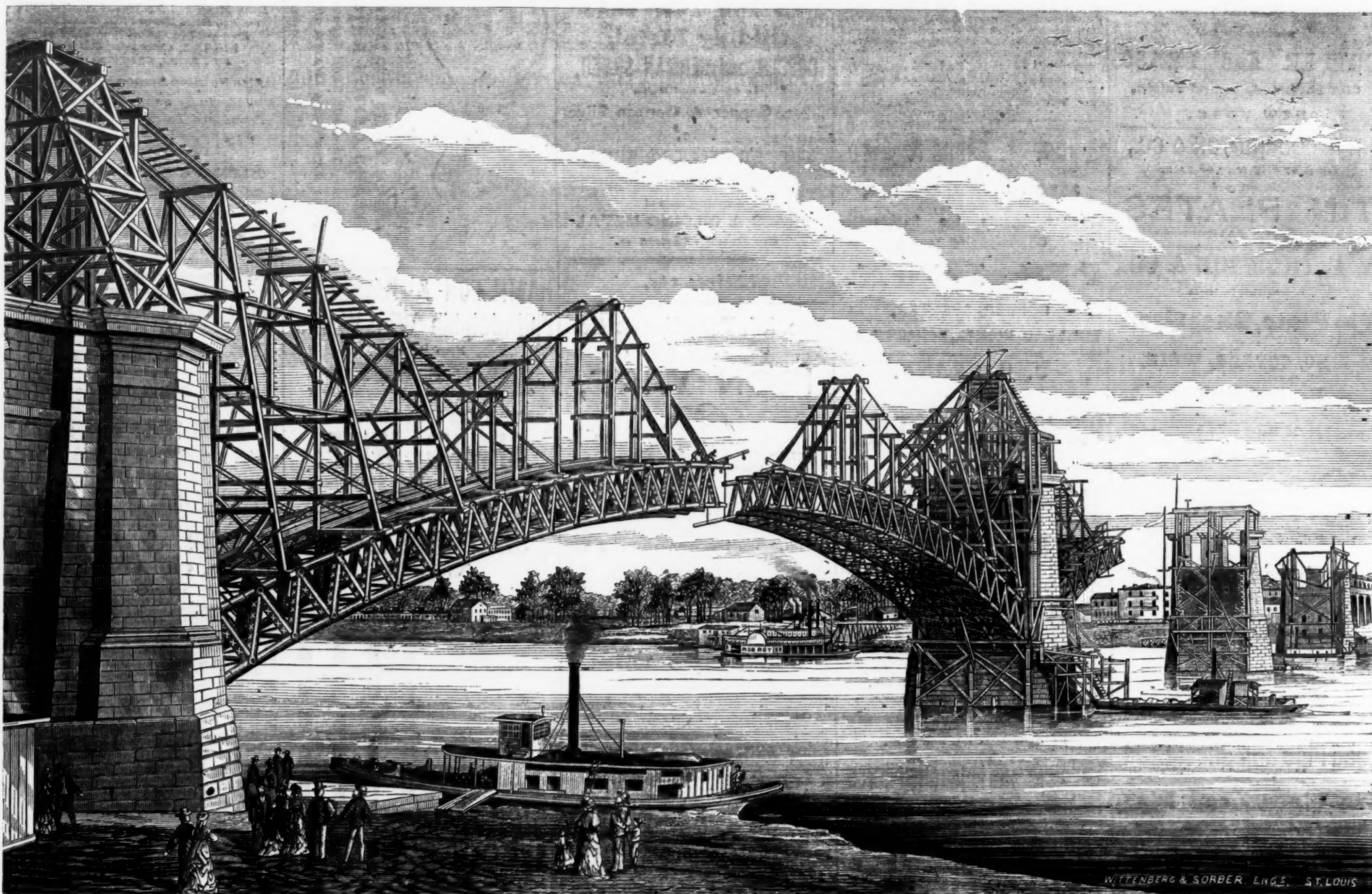
diminished as they approach the center of the arch. These struts will rest upon the heads of the couplings where the tubes are strongest, and, as only a direct weight comes upon them, will be able to bear five times more than the bridge company will ever permit; for the transit of trains will be entirely in the hands of the company's officers.

New Geological Revelations.

The forthcoming annual report of the Govern-

of the geologist to reconstruct past worlds and repopulate them with their ancient inhabitants; and in these curious, extinct forms of life, thus brought to light, the history of the succession of life on this continent will be made much clearer by the number of missing links they will help to supply, and the light which their discovery will tend to shed on the modern theory of evolution.

It is a curious fact, and one of great practical importance in constructive engineering, that in the salt mines of Poland and Hungary the gal-



THE STEEL BRIDGE AT ST. LOUIS.

we find in the letter of a correspondent of the *Times*, will be of interest to engineers:

The river is spanned by three arches springing from east and west abutment towers to piers in the river. From the abutments to the piers, east and west, the arches have a span of 592 feet; the central arch, from pier to pier, has a span of 590 feet. These arches are of cast steel. The bridge being double, the arches are double, but the principle can be more easily shown with one part; for as it is built, it is really two bridges joined together, and it could be made indefinitely broader or narrower, according to requirement. The arch is composed of tubes, each 12 feet in length, joined together by most admirable couplings. There are four sets of tubes, arranged two above and two below. The top and bottom row form what is technically called a chord, and these are united together by main braces in the form of the letter A. The two chords are united laterally by huge tie rods. That is the whole principle of the matter.

The *modus operandi* is as follows: The tubes are brought in barges underneath the place where the men are working, and are elevated by a small stationary engine. The ends of the tubes are so nicely grooved that they fit in very tightly, even without the couplings. They are grooved also on the outside, to correspond with the grooves and fillets of the couplings. When the latter have been applied, an enormous pin, with a diameter of five inches and a weight of 100 pounds, is screwed through the couplings, going, of course, also through the united ends of the two tubes. The bridge being double, there are eight rows

arch is regulated to a pound weight by means of hydraulic rams. When the temperature rises the cables stretch, and the whole fabric of uncompleted arching sinks a little. It has to be raised up, and the rams do this by taking a little gentle pull upon the cables, or, as the mariners would say, "hauling taut." This is effected by pumping a little glycerine into the rams. If, on the contrary, the temperature falls, the cables contract and tilt up the arching a trifle more than is required. Then the watcher over the rams has to pump out a little glycerine, and the pressure on the cables is relaxed. This little place where the rams are may be considered the great artery of the work. The perfect control that Captain Eads and his assistant have over their off-spring is sometimes evinced in an amusing way. The method of construction to preserve the just balance is naturally to build the tubes half way from each side of a pier at the same time, so that one-half balances the other half. The engineers commenced in this manner with the pier nearest the western bank, building up, at the same time, the tubing from the western abutment. When the latter met the western half of the first pier, the extremely hot weather had expanded the metal, and the tubes would not unite. Baron Fladd immediately bought hundreds of bales of gunny bags, and packed the recalcitrant tubes in ice. All night the thermometer kept rising, but the ice did its work, and they came together so closely that you could not have seen daylight between them. The same result could have been obtained by blasts of cold air, but the Keystone Bridge Company, of Pittsburgh, who have the

four steel bolts, five inches in diameter, which go back into the very bowels of the pier, twenty-eight feet, and are then driven through an anchor plate. This fact will give a better idea of the huge masses of masonry serving as piers than any formal statements or measurements. The men engaged in the construction belong to a class which American enterprise has called into existence. They are bridge builders, working at nothing else; and though not scientifically educated, have a rough and ready comprehension of the work they do, which tends to elevate their minds. They are trained to perfect exactitude in the smallest details. If a bolt does not fit perfectly, there is no thought of assisting it promptly with a sledge hammer; but there is an instant conclusion that, by some accident, the bolts have become mixed, and that this is not the special bolt for that particular hole. For down to the minutest scrap of iron, everything has been fitted at Pittsburgh, and must fit here. To nearly fit will not do; it must absolutely fit. The consequence of such exact training is exemplified in the conduct and manner of the men who are, without exception, the most intelligent and orderly body of workmen I have ever seen. With such men rapid progress is certain, and there can be no doubt that the arches will be completed before the end of November. But the bridge will not be finished then, by any means. The roadways have to be built upon it. The upper one will be for omnibuses, foot passengers, etc.; the lower for a double tracked railway. These two will be supported by struts, the longest of which, near the piers, will be 56 feet, and then gradually

mental Geological Survey of the Territories will contain descriptions and illustrations of a very extensive and remarkable collection of fossil remains of beasts, discovered by Professor Cope, in the barren and treeless tracts known as the "Bad Lands" of Colorado. Prof. Cope has proved the existence of more than a hundred species, some of them represented by thousands of individuals. Of these at least seventy species are new to science, and they range from the size of the mole to that of the elephant. Of cloven footed quadrupeds a great many specimens, some of which were nearly intermediate between the deer and the hog, have been found; while no less than seven distinct species of rhinoceri were discovered. But the most remarkable monsters whose existence has been disclosed by the survey are a series of horned species related to the rhinoceros, but possessing some features in which they resemble the elephant. They stood high on the legs and had short feet, but possessed osseous horns in pairs on different parts of the head. One of the largest species had a huge horn over each eye, while another had one on each side of the nose, more than a foot in length. A third had rudimentary horns on the nose. Still another was as large as the elephant, its cheek bones being enormously expanded, and its horns flat; while a fifth species had triangular horns, turned outward. Many carnivorous species were also unearthed; one of which resembled a dog, but was as large as the black bear, and much more carnivorous in its propensities. Some of the cats had remarkably long canine or eye teeth. In a new species, the size of the panther, these teeth almost exactly resembled those of a shark. It is the province

leries are supported by wooden pillars, which are found to last unimpaired for a res, in consequence of being impregnated with the salt, while pillars of brick and stone, used for the same purpose, crumble away in a short time by the decay of their mortar. It is also found that wooden piles, driven into the mud of salt flats and marshes, last for an unlimited time, and are used for the foundations of brick and stone edifices; and the practice of docking timber, by immersing it for some time in sea water after it has been seasoned, is generally admitted to promote its durability. There are some experiments which appear to show that, after the dry rot has commenced, immersion in salt water effectually checks its progress and preserves the remainder of the timber. If care be taken to renew the coat of paint as often as it decays, wood on the outside of the building may be made to last for centuries; paint, however, is no preservative against the dry rot, notwithstanding the opinion so generally prevalent to the contrary.

Ancient Mines.—Recent discoveries upon Isle Royale, Michigan, a considerable island in Lake Superior, show that some ancient race, at some distant period in the past, have done very extensive mining work. Traces of this ancient mining are very frequently found all through the Lake Superior copper region; but at this especial point, and on a single location of less than 2000 acres of land, a greater amount of labor is said to have been performed by these unknown workmen than has been expended by a large force of men during twenty years at one of the oldest and largest of the modern copper mines in that district. Who are these men—and for what purpose did they procure the copper? It is a pity that some organized effort should not be made to procure tools and other remains of these mysterious workmen, with such facts as might help to elucidate their history. Antiquarian research is a vast uncultivated field in America, and we are fast destroying or obliterating every relic of our prehistoric races, whose remains surely should be of great interest to us.

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Automatic Safety Hatches.

A law was passed by the N. Y. State Legislature during the Session of 1872-3, requiring all proprietors of buildings containing hatchways to keep the latter closed, except when the elevator is passing, and imposing a fine for every violation of the law. This regulation was made in view of the facts developed by the recent great fires, especially that of Boston. The continuous opening from the bottom to the top of the building, formed by the unclosed hatches, served, in many cases, during the great fires of Boston and Chicago and other places, as flues through which the flames mounted to the upper floors, and spread themselves throughout the building. The effect of this continuous opening was also to feed the fire with air, so that the hatchways assumed the double purpose of extending the ravages of the fire and increasing their intensity. Had it been possible in these cases to have closed the hatches the destruction would, doubtless, have been much less, but, during the excitement of a fire, in the confusion of removing goods, such a consideration is apt to escape one's attention; and, again, the attempt would be attended with great danger, even if it were possible, for in such a quarter the flames would, in most cases, be raging with the greatest violence; and, finally, before such a measure could be accomplished, great destruction would have already been occasioned, or, perhaps, the flames would be even past control. It is necessary, therefore, that the hatches be constantly closed, or, at least, if an opening of this character through the building does exist, all communication between it and the floors should be cut off. In passing, it should be remarked that plans for accomplishing this object have an additional advantage—they prevent workmen or firemen from falling through the openings.

Much ingenuity has been displayed by various inventors in furnishing this requisite. Some of the plans have already been applied, and in the case of a few of them their manufacture has been made a specialty of certain machine shops. The oldest plan is Sinclair's, of Brooklyn. This, however, is not automatic. In its operation a rope is attached to each hatch cover, which is so arranged as to slide under the floor. All of the ropes pass over pulleys to the cellar, where the former are attached to an axle or drum provided with a crank to be operated by hand. The hatches can thus be all closed simultaneously. Where this plan is employed the hatches are usually left open all day and closed at night. If a fire occurs some one must go the cellar and close the hatches, and the advantage of the plan is the rapidity with which this can be done. It is objected to, however, that as it requires the attention of a man, who must go down to the cellar to close the hatches, much mischief may have been occasioned by the fire before the evil can be remedied. Its application to a building may be effected very economically.

A very primitive plan was proposed by Alex. Fries, of Cincinnati, three years ago, for the prevention of accidents. It consisted in the provision of one or more nets to be suspended within the hatchways. This plan, of course, does not remedy the difficulty arising from fires.

Among the plans which may be called automatic, is a class in which the hatch covers slide back on rails under the floor. In such cases the cover is usually divided in the middle, one half sliding one way and the other in the opposite direction. When these hatches are employed the elevator car has a wedge shaped roof, so as to part the covers and push them back into their places under the floor. The edges of the covers, also, which meet, are sometimes provided with small wheels or rollers, against which the roof presses; the latter provision dispenses with much of the friction caused by the roof rubbing against the hatch covers. A counterpoise weight is connected with the covers, which brings them together again when the car has passed. The bottom of the car, also, is usually of a wedge shape, to prevent the covers from coming together suddenly. A modification of this invention has been proposed by Mr. J. Russell, of Chicago, in which the covers slide back, each on an inclined plane, so that when the car has passed they close together again by their own weight.

A plan, depending for its operation on sliding covers, was patented by Adolphus Brummel, of Brooklyn. The elevator car carries vertical toothed racks, projecting from its upper and under sides. These racks engage with pinions which themselves operate toothed racks, attached to the horizontally sliding doors. As the elevator approaches the sliding door the vertical toothed racks act on the pinion which operates the rack attached to the sliding doors, separating them and allowing the car to pass, after which the rack on the other side of the car engages the pinion, closing the doors again. In all such devices it is evident that the hatchway is always closed, except when the car is passing. It is objected to them, however, that to build the frame-work necessary for the cover to slide back upon weakens floor beams, and if to avoid this disadvantage the railway is suspended below the beams, there is still a very serious hole left, even when the hatchway is closed, equal in depth to the thickness of the floor.

In another class of automatic hatches the covers are so arranged as to work on hinges. The manner in which the upward or downward motion of the car is communicated to the hatches varies in the several inventions. In the following cases the car causes a vertical shaft to revolve by the agency of levers, or otherwise, the revolution of the shaft causing, by appropriate appliances, the doors to raise or fall.

The Wilson and Waring hatch is now manufactured by Mr. Henry McCollum, of Hunters Point. In this device there is a vertical shaft

located at one side of the hatchway, its position, whether near the guide post or otherwise, being a matter of but little consequence. From the shaft, both above and below the hatchways, project arms or levers, curving outward and downward in the case of those above the hatchway, and in the case of those below projecting outward and upward. As the car rises it strikes against the lower arm, turning it round and pressing it inward, and turning the shaft upon its axis. Where the latter intersects the floor it is provided with a quadrant mitre gear wheel, which gears into a similar wheel revolving on a horizontal axis to which the hatch cover is attached. As the vertical shaft revolves the horizontal shaft revolves also, causing the door to open. The car continues to ascend and bears against the lever above the floor, keeping it pressed in until the car has passed, when the arm returns to its place again, the cover falling by its own weight. The covers are opened as the car descends in the same manner. The apparatus required in this case is very simple.

A plan, involving very intricate machinery, was invented by Mr. James Wayland, of Jersey City. In this plan the car, as it rises, turns a vertical shaft by cams on the guide plates of the car, acting on spring levers attached to the shaft. The shaft has a projecting horizontal arm which revolves with it and engages a pin upon the cover, and thus raises the door. The cover is divided into halves by a line passing diagonally across the hatch.

Still another device, involving a vertical shaft, is the following, invented by Mr. Edward M. Hackett, of this city. In this case the vertical shaft has a spiral groove upon its surface. The car is provided with a pin projecting outward, and as the car rises or falls, the pin passes into the groove, and by its upward or downward pressure causes the shaft to revolve. The latter carries a horizontal arm, which revolves with the shaft, and raises and supports the hinged doors. When the car has passed the opening, the pin still following the groove, which then changes its direction, causes the shaft to revolve so as to allow the door gradually to fall again.

Another system employed for the purpose of communicating the motion of the car to the covers, involves the use of a system of levers, actuated by a cam or pin upon the elevator. Such is the plan proposed by Mr. John W. Meeker, of Detroit, who is endeavoring to introduce his hatches into general use. In this case a lever projects obliquely upward from each floor alongside of the hatchway. The fulcrum of the lever is at its foot, and at a short distance above the foot is pivoted a horizontal bar. When the lever is pressed downward or springs upward the horizontal bar moves forward or backward. The hatch cover is double, each half hinging on opposite sides of the hatchway. To each end of the horizontal bar a small crank is pivoted, keyed at its lower end to horizontal shafts, to which the covers are attached, and on which they revolve. As the horizontal bar, therefore, moves in one direction or the other these cranks revolve, causing the covers to open, one upward and the other downward. On the exterior of the car a cam or pin is placed, which engages the lever as it moves upward or downward, causing the doors to open. The inventor of this plan claims as a very important advantage in his device that the arrangement whereby one cover opens upward and the other downward, reduces to a minimum the power necessary to move the lever, since the weight of the falling door is almost sufficient of itself to raise the other.

Another plan, proposed by Mr. Alex. Reid, of this city, operates in the following manner. The hatches in this, as in the former case, are double, hinging on either side, only that in this hatch both covers open upward. The car has a cam shaped roof, and as it rises, lifts the hatches. The latter are connected by means of a system of levers, with two main curved levers or arms, which, when the hatches are closed, extend horizontally over the hatchway. As the covers rise the arms fall until they lie against the side of the hatchway, thus allowing the car to pass. As the car passes the arms bear against the bottom of the car, which, as it rises, allows them to gradually regain their original position, and thus also allows the covers to fall gradually into their position. When the car descends, the bottom bears against the arms, opening the hatches, and, having passed through the hatchway, eases the fall of the covers by means of its cam shaped roof.

A very novel plan has been proposed by Mr. Chas. H. Reynolds, of Williamsburgh, N. Y. Its design is not to close the hatches every time the elevator car passes, but to provide for their closing in case of fire. The hatch in this, as in the preceding case, is double, each half hinging at the side. Alongside of the hatchway is a rod passing through all the floors of the building except the lowest. At a short distance above each floor the inner ends of latches are pivoted to the rod. Between the rod and the hatchway on each floor a standard is placed, upon which the latches rest. The outer ends of the latches project over the hatchway, and on their under surface notches are formed. The hatch covers have short arms attached to their outer edges, and when the hatch is raised the arm strikes the latch, lifts it and moves along its under surface until it enters the notch, when the latch falls and holds the hatch open. When the latches are raised, the covers, of course, close by their own weight. A tube, open at the bottom, passes through all the floors, and within the tube is a rope fastened at the top, supporting at the bottom one end of a lever, the other end of which is pivoted to a support attached to the lowest floor, and to its free end (i. e. the end supported by the rope), is fixed a heavy weight. Upon the pivoted end of the lever is formed an upwardly projecting arm, upon which rests the rod to which are attached the latches at the various floors. When

there is a fire the draught of the tube just described draws in flames, which burn the rope, let fall the weighted end of the lever, and thus jerk the arm formed on the pivoted end of the lever from beneath the rod which it supports. The rod then falls, raising by its fall the outer ends of the latches, and the arms on the hatch covers being thus freed from the notches, the hatches fall.

Messrs. Hawkins & Dodge, of 56 M. & E. R. R. avenue, Newark, N. J., have organized a company known as the N. Y. Safety Hatch Co., 18 Vesey street, N. Y., and are manufacturing an automatic safety hatch entirely different in principle from any described above. The hatches in this case are not divided nor hinged, but may be lifted bodily from their places. A portion of the roof of the car is flat, and, as it ascends, lifts each cover from its place and carries it to the top of the building. Therefore, when the car has ascended it is supporting all of the covers, and, as it descends, leaves them one by one in their places at the several floors. Each cover is provided with four iron studs or short arms, two of which project from each side, that fit in and rest upon iron shoes placed in the sides of the hatchway. The cover is lifted out of its place by the rising of the car, and when it reaches the floor above the projecting arms pass through grooves cut in the side of the hatchway for that purpose. It is evident, therefore, that, in order that the projecting arms on each cover may not strike against any of the shoes in the various hatchways except those in which they belong, the arms should be placed at different points along the edge of the hatch.

In the plan just described it will be seen that when the car is at the top of the building the hatchways are all open. To meet this disadvantage and prevent accidents, a series of hatches, one beneath the other, are suspended from the elevator frame, each hatch supporting that beneath it. As the frame ascends these covers will severally come in line with the several floors of the building and close the hatch openings therein; when the car is at the foot of the hatchway the covers lie together beneath it, one upon the other.

Another plan, bearing no resemblance to any of the preceding, has been proposed by Mr. Joseph Baldwin, of Newark. In the operation of this device, two sides of the hatchway are supposed to be closed up by the framework of the hatchway. A broad belt or curtain is attached to the top of the car, and passed over a roller at the top of the building, then descending on the other side to the bottom, passing under a roller there and upward to the lower part of the front side of the elevator car. As the latter ascends or descends the curtain completely closes up all entrance to the hatchway except by the door of the elevator. The manufacturer claims, therefore, that, inasmuch as at any floor the hatchway is entirely closed either by the curtain or the car, the hatchway cannot be a means of communicating the fire to various parts of the building. The curtain must always be stiffened by cross slabs, and, if constructed of a perishable material, can be made fire-proof.

Mr. A. B. See, of Yonkers, proposes a plan in which the covers fold up on the approach of the elevator, to admit of its passage, and expand and close the opening on its recession.

Ohio River Improvements.

Upon the subject of the improvement of the navigation of the Ohio River, and some of the difficulties encountered, Major Merrill, of the Engineer Corps, has made a very interesting report. The largest commercial interest on the Ohio is concentrated upon the upper portion of the river, between Pittsburgh and Wheeling. Here the great difficulty is lack of water. In some places where the channel is narrow, as at the "Trap," just below Pittsburgh, where the river is only 225 feet wide, there is often but eighteen inches, and frequently only a foot in depth of water. This can be slightly remedied by dredging and reducing slopes; but the bed-rock is exposed in many places near Pittsburgh, and any attempt at establishing a regular grade would be very expensive, and even if successful, could scarcely be expected to secure a better minimum stage of water than two feet. The radical improvement of the river is suggested, so as to thoroughly adapt it to the wants of commerce by making the channel not less than three hundred feet wide, with a minimum depth of six feet. This can only be accomplished by securing a large addition to the water supply of the river. A through cut to Lake Erie will not answer, because the Ohio does not descend to the level of Lake Erie until it reaches Parkersburgh, 188 miles below Pittsburgh. Just how to thoroughly remedy the defective navigation of the Ohio in a way that will not be too expensive, the engineers as yet seem at a loss to determine. They have been busily engaged all the season in making improvements by dredging and other means, and in this way have removed shoals, and in many places deepened and widened the channel, a system that is desultory, and therefore but partially satisfactory.

People who prefer wetting the winter's store of coal to lay the dust on putting it into their cellars, do not generally know that they are laying up for themselves a store of sore throats and other evils consequent upon the practice. Even the fire damp, says an exchange, which escapes from the coal mines, arises from the slow decomposition of coal at temperatures of but little above that of the atmosphere, but under augmented pressure. By wetting a mass of freshly broken coal, and putting it into a cellar, the mass is heated to such a degree that carbureted and sulphureted hydrogen are given off for long periods of time, and pervade the whole house. The liability of wet coal to mischievous results, under such circumstances, may be appreciated from the fact that there are several instances on record of spontaneous combustion of coal when stored into the bunkers or holds of vessels. And from this cause, doubtless, many missing coal vessels have perished.

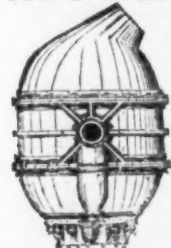
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SECOND FLOOR

New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN FURNACES FOR THE MANUFACTURE OF IRON AND STEEL.

Specification forming part of Letters Patent No. 143,145, dated September 23, 1873, issued to George E. Harding, of New York.

In the accompanying drawings, Fig. 1 represents longitudinal section at J. K. Fig. 2 represents transverse section at A. B. Fig. 3 represents horizontal section at C. D. Similar letters indicate corresponding parts.

The improvement consists in the application of a rotary puddling furnace for the reduction of iron ores, in combination with a furnace for producing the gases of combustion and a deoxidizing chamber for utilizing "waste" gases for deoxidizing and carbonizing the ores previous to their reduction in the rotary by means of retorts or shelves arranged in the chamber to intercept the waste gases on their way to the stack.

In Fig. 1 the apparatus, as preferably adopted, is shown. A large rectangular chamber is connected with the base of the stack by the flues and dampers p, p', p'' , and also with a rotary puddling hearth e and furnace f by the shaft c . This deoxidizing chamber can be either provided with the vertical retorts a, a, a , and the horizontal shelves or hearths z, z, z , as shown; or, in certain cases, the retorts can be omitted and shelves alone superposed. The former arrangement is preferable, and the retorts are charged from their top with a mixture of pulverized ores, flux and carbon. At first the gases

ment shown, perform the double purpose of guiding the gases of combustion and serving to connect the several joints of the retorts, while at the same time, in the event of injury to any section of a retort, that portion can be readily removed and replaced without disturbing any other part of the chamber.

By the proper adjustment of the dampers p, p', p'' , any desired direction and pressure of the burning gases can be obtained, and the deoxidation of the ores, as well as the pressure of the gases in the rotary, may be under complete control.

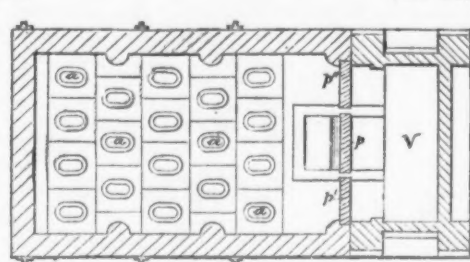
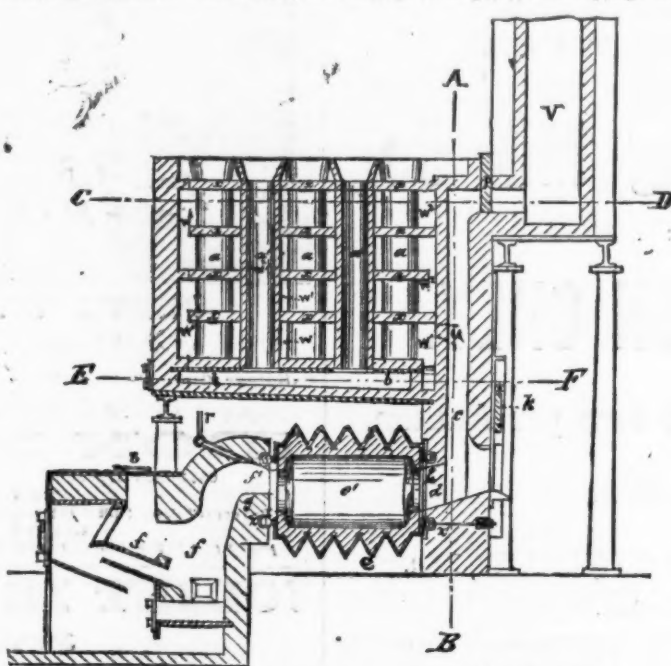


Fig. 3.

The rotary hearth shown beneath the deoxidizing chamber is of corrugated section of cast or wrought iron, so arranged as to hold the refracting lining and fettling, and also to radiate the heat that reaches the casing as rapidly as possible. To this end holes are also made in the casing, as shown. It is also provided with tapping hole for drawing off the cinder, and has the rings z, z , pressed against each end of the rotary hearth by springs and rods to prevent leakage of the gases, which springs are adjust-



IMPROVED FURNACE FOR MANUFACTURING IRON AND STEEL.—Fig. 1.

from the furnace passing through the rotary are allowed direct vent to the stack by the shaft c and flue p ; then, when well under blast, the damper p is closed and the gases are diverted through a backward and forward between the retorts a, a, a , passing through w, w', w'', w''' , and flues p', p'' , Fig. 3, into the stack, impinging against the retorts at different elevations and at right angles, thus parting with a very considerable portion of their heat to the retorts

able by puts at the outer rounds x' . The face of each ring is beveled, allowing any lodged cinder to work out automatically and prevent binding of the rotary.

The furnace shown is similar to the Wilson gas puddling furnace, but any gas or common furnace may be used. Immediately above the bridge walls g , however, are introduced the concentric pipes r , by which a jet of combined steam and air is injected in such varying proportions as the different stages of the puddling process demand, and which has been already secured to the inventor by Letters Patent, dated July 30, 1872, No. 130,044.

Claim.—1. The general arrangement of the furnace f , rotary e , flue d , shaft c , chamber w , w', w'', w''' , retorts a, a, a , and dampers p, p', p'' .

2. The rings z, z , with beveled faces and adjustable tension springs x' , as shown and described.

IMPROVEMENT IN FURNACES FOR SMELTING ORES. Specification forming part of Letters Patent No. 141,912, dated August 19, 1873, issued to Edward Balbach, Jr., of Newark, N. J.

In the drawings hereto annexed, Figure 1 is

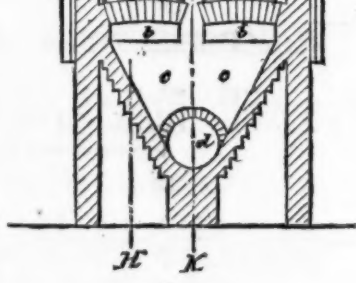


Fig. 2.

and the contained ores. The retorts, preferably of elliptical section, discharge their contents into the common receptacle b, b , which receptacle is provided with the sliding gates and air-tight doors.

Whenever it is desired to introduce a charge of deoxidized ores in the rotary hearth, the gates are raised by connections at their ends, and by opening the doors connecting with shaft c , the requisite quantity is raked to the shaft, whence, by means of the door h , the charge arrives in the rotary without undue exposure to the oxygen of the air. The rotary is then operated by suitable mechanism, undergoing the necessary agitation and puddling, and the ball finally removed by the door h to the hammer or squeezer, when a new charge is similarly brought down. As the ores are removed at their tops, and by drawing alternately from the different series of retorts the operation becomes continuous.

The divisions or shelves z, z, z , in the arrange-

the heat, &c., passes from the fire chamber into the furnace; and H the flue connecting with the chimney. I is an outlet for the matter contained in the furnace; and K is an annular chamber surrounding the discharge flue I , in which the water circulates around, said discharge flue.

This invention consists in surrounding a furnace, on its sides and bottom, with a trough filled with water, and constantly supplied with a stream of cold water entering at or near the bottom, and discharged at or near the top, of the trough, substantially as shown. By this means the water is prevented from generating steam, and the walls of the furnace are enabled to withstand the heat, and will endure for years.

The trough may be continuous, extending all around the furnace; or it may be made in sections, and each section provided with a supply pipe, and a discharge for the water, substantially as shown in the drawings accompanying this specification.

The trough surrounding the sides of the furnace should be high enough to cover the point occupied by the ores or other matter within the furnace, and two inches, more or less, in width, as circumstances may require.

The trough may be made of cast or wrought metal; and used, in some cases, without the inner lining of fire brick, when the purpose for which the furnace is to be used will admit of it.

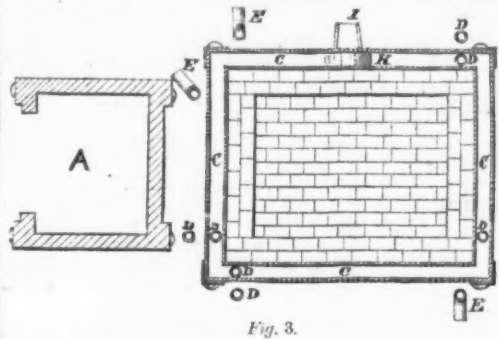


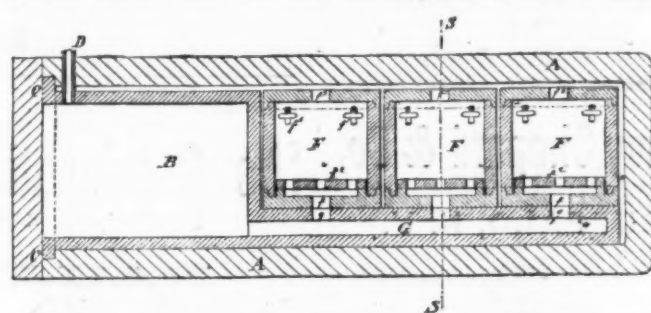
Fig. 3.

Claim.—A furnace for smelting ores or other purposes, having its bottom and sides surrounded by a trough or troughs of running water, substantially as and for the purposes described.

IMPROVEMENT IN TREATING IRON AND STEEL TO ANNEAL AND TOUGHEN THEM.

Specification forming part of Letters Patent No. 142,977, dated September 23, 1873, issued to Albert F. Andrews, of New Haven, Connecticut.

The inventor says: I have, in my experiments, succeeded in imparting to common cut nails of the ordinary brittle character a tough and very much improved nature. The nails, after



IMPROVED RETORT FOR TOUGHENING AND ANNEALING IRON AND STEEL.—Fig. 1.

being subjected thirty hours to my treatment, were capable of clenching with success, and even of being folded over or doubled in a cold condition. I esteem my process peculiarly valuable in the treatment of articles cut by dies from sheets of rolled iron. I subject the iron, while hot, to a slow current of hydrogen gas, or of a mixture of gases of which free hydrogen forms a large constituent. I can greatly improve steel, to render it soft for engraving and tough for chisels or other working purposes, by subjecting it to hydrogen at a red heat. For decarbonizing steel for gun work or other purposes the temperature should be higher. It should be almost the same as for toughening

the action. I believe that the iron is decarbonized or dephosphorized to some extent, but that the effect is largely due to a very thorough desulphurization, which occurs under these circumstances. My experiments have indicated a high degree of certainty in the results. The effect is most marked on very bad iron; but I believe that good iron and steel of all grades will be greatly improved in toughness by this treatment. Thirty hours is the time I have found proper for treating very brittle cut nails.

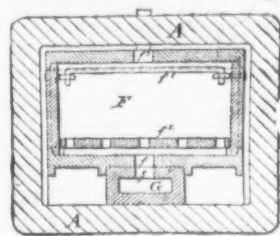


Fig. 2.

The current of gases should be slow, or the iron is liable to be cut away by its mechanical action when at a very high temperature. On the other hand, the flow of gas should not be intermittent altogether, as the result is liable, in such cases, to be disastrous to the entire batch of material.

The accompanying drawings form a part of this specification, and aid to describe what I consider the best means of carrying out this invention.

Figure 1 is a vertical longitudinal section of a retort with small boxes suitable for treating iron articles. Fig. 2 is a cross section thereof on the lines $S S$ in Fig. 1.

Similar letters of reference indicate corresponding parts in all the figures.

A represents a retort or chamber of fire brick, surrounded by fire within a furnace. (Not represented.) B is a box or casing, made of

iron or fire brick, for holding incandescent charcoal. D is a pipe on the top, at one end of this box, to admit steam. C is a flange on end of charcoal box, on which an iron or fire brick door is luted. G is a flat tube, to be used in connection with boxes F , a series of which are provided, each containing pieces of iron or steel to be treated. Each box F has a hole in the bottom, to receive the gas from the corresponding hole in the tube G , so that it can circulate, through the perforated false bottom, up among the small pieces of iron or steel, the gas escaping at the top of F . As iron or steel, after heating, adheres more or less together, and for the convenience of unloading said

boxes F , each is made entirely of separate and detachable pieces. The bottom of F is flanged on its external edge, to inclose and hold the sides and ends. The cover is also flanged in the same way, for the same purpose. The ends of the box are recessed, to hold the sides. To hold the upper portion of the box when the cover is not on, and while the box is being filled, rods f' , each with a right angle bend near each end, traverse the box from end to end, and engage with loops or lugs to receive them. These boxes can be luted at the joints, to make them gas tight.

When a box is to be unladen the cover is removed, and the rods f' taken out. Then the sides and ends can be repared, and the contents easily removed. The box F can be made of iron, or of ordinary clay, if preferred.

The nails, latches, parts of gun locks, or other articles which it is desired to toughen, are piled, in a layer of moderate thickness, upon the grating f' . There may be several of these gratings, supported on suitable ledges on the interior of the boxes F , so as to support several layers above each other without subjecting any of the iron to much pressure from the superincumbent material. The boxes F , with their contents, being placed in the proper positions on the tube G , the gas is allowed to flow into the tube and up through the holes g, g' , and thus through the spaces between the pieces of iron in the boxes F , escaping ultimately through the holes f' in the top. The furnace is kept at such temperature that the iron is at a heat above bright red. It should approximate to what is generally known as a white heat, but should not go high enough to induce welding.

A modification, for the treatment of iron or steel in long pieces or bars, is made by using a broad perforated tube, of the same width of the charcoal box B and of the inside of the retort A . The bars are to be laid singly or in bundles on this perforated tube or bottom, being inclosed in the retort A air tight.

Claim.—1. The charcoal box B , in connection with the narrow tube G , and the box or series of boxes F .

2. The construction of the box F in separate or detachable pieces.

3. The retort A , in connection with the charcoal box B and broad perforated tube, for treating bar iron or steel.

4. The within described treatment of wrought iron and steel, by subjecting it to a slow current of free hydrogen, as specified.

through which the water passes out of the trough. F, F are gates or lids, which cover the openings through which the ores or other materials are thrown into the furnace. Said gates slide upon rollers a on the top edge of the furnace; or they may be operated in any other convenient manner. G is a flue, through which

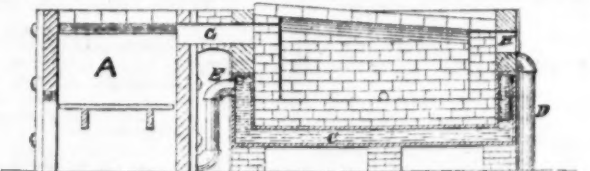


Fig. 2.

coal it is decomposed; the oxygen of the steam goes to the carbon, to form carbonic oxide. The hydrogen thereby set free flows along in a state of mechanical mixture with the carbonic oxide, and flows up at a high temperature among the previously heated pieces of iron. It may not be necessary to explain the theory of

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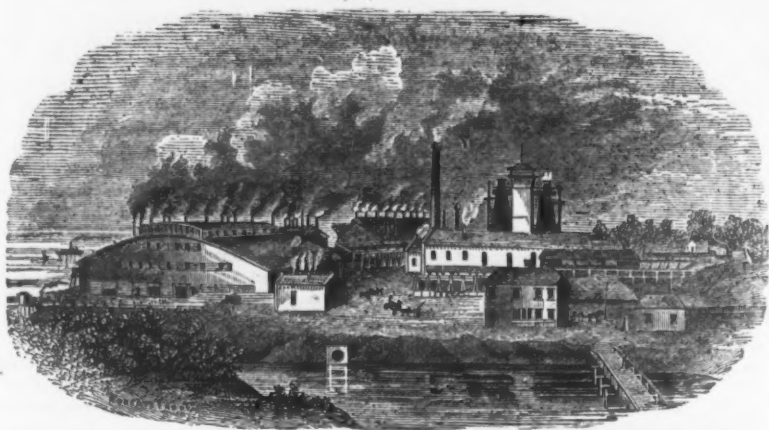
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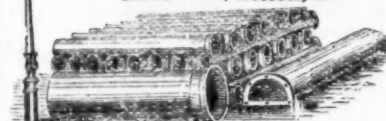
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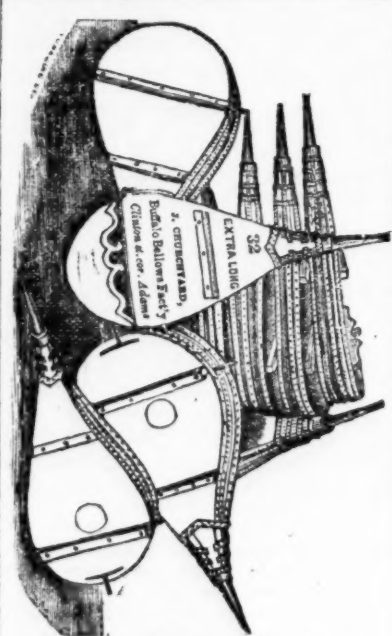
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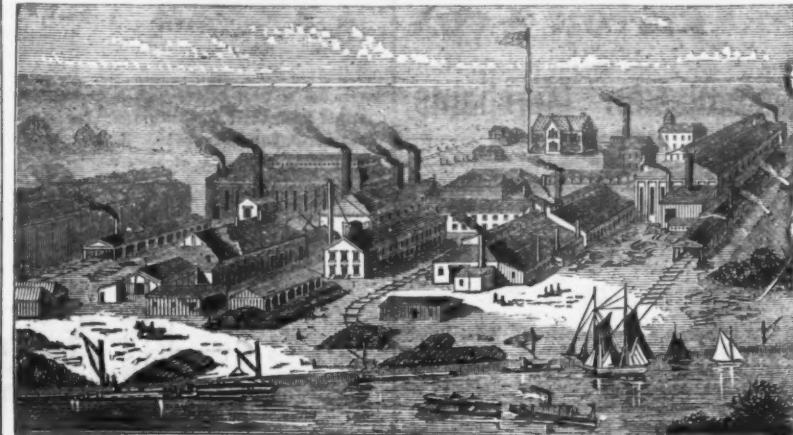
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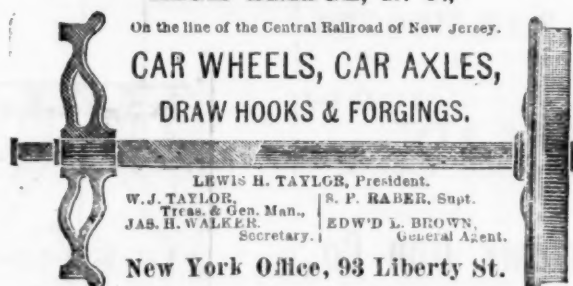
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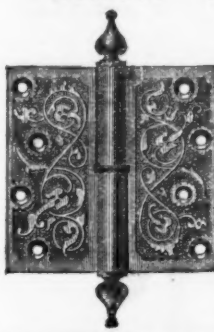
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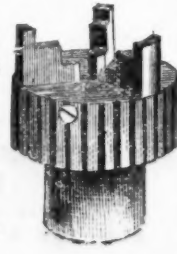
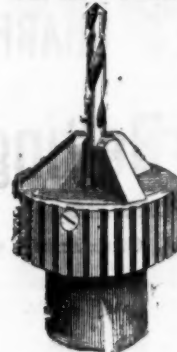
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**IRON WORKS IN THE NORTH OF ENGLAND.***The Casson, Spencer and Danks' Puddling Process.*

A British iron master sends us the following interesting account of a run through the iron works of the North of England:

It would be *cavalier* to your readers to describe our journey from the Black Country of South Staffordshire to the North; and merely descriptive writing would not fall in with the purpose I have in view. To plunge into the matter therefore at once, I may say that we made Durham our starting point, and thence drove to the Weardale Iron and Coal Company's Tudhoe Works, at Ferry Hill. We were most heartily received by the manager, Mr. William Hutchinson, and under his guidance and direction proceeded at once to the inspection of the blast furnaces. These are four in number, 85 feet in height from the base, 26 feet across the boshes, and are capable of turning out 1600 tons of pig iron per week, being an average of 400 tons for each. In connection with them everything that ingenuity can devise is done to save labor and reduce the cost of production. The raw material is delivered by trucks with moveable bottoms into huge kilns or tanks, with valves acting so as to deliver into barrows as required. There, as at all the furnaces in the North, we found the temperature of the air and the pressure of the blast double the temperature and pressure common at a great many of the furnaces in South Staffordshire. From the blast furnaces we proceeded to the forges and mills belonging to the same company. These are on a very large scale, comprising as they do seventy-five puddling furnaces, beside plate, sheet and rolling mills. Here we had an opportunity of inspecting the working of the "Casson-Dormoy" puddling furnace, of which a good deal has been heard in South Staffordshire. The furnace in question is a double one, with circular cast iron basin, and sloping sides resting upon an open water dish. The heat of the plates causes the steam to rise, and keep the basin above cool, thereby saving, as we were informed, about two-thirds in fuel. Between the puddling chamber and stack, and in lieu of the neck, there is a chamber, where the cold pigs are placed and heated to incipient fusion by the waste heat of the furnace. As soon as the balls are drawn, these hot pigs are passed over the bridge into the puddling chamber, and in about twelve minutes are melted. In order to meet the extra work that this system enables the furnace to do, two of Griffiths' machines—one for each side of the furnace—are connected with it. We were informed that this furnace produced seven heats per shift, each heat averaging 11 cwt., and that the consumption of coal was at the rate of 15 cwt. per ton of iron. Since then we have heard that as many as nine heats per shift have been turned out, and that the quantity of iron puddled was 10 cwt. each heat. Under these circumstances the quantity of fuel must have been reduced in proportion. So satisfied are the company with the operations of this trial furnace that they have adopted the system, and men were there erecting another furnace of the same kind. From the works of the company we proceeded to inspect an adjoining pair of pits. These pits draw something like 2000 tons a day. They are 60 fathoms deep, and the seam, which is 3 ft. 6 in. in thickness, is worked on the rib-and-pillar principle. The sorting of the lumps from the slack is done by a very clever arrangement of the screens above, and without the aid of manual labor. This coal is well known for the excellent coke it makes, which, owing to the burden it will carry, gives such an immense advantage to the North in enabling them to work with such high, and consequently economical, furnaces. We observed that there were 240 kilns on the bank, in two rows, six to a stack, and that there were in stock about 6000 tons of coke. We were much pleased with the cleanly condition and appearance of the colliers' houses, the property of the company.

Our next visit was to the West Hartlepool Works—Messrs. Thomas Richardson & Sons—where we saw Spencer's puddling furnace in operation. This furnace consists of a square chamber, the interior dimensions of which, when fettled, are 9 ft. 6 in. by 4 ft. 8 in. It is revolved, by means of toothed gearing at each end, connected with two 5 horse-power horizontal engines; and the chamber is constructed of wrought iron transverse ribs, tied together by square bars an inch and a half in diameter. A moldpiece is used to fettle the inner side of the rib, and is removed when the fettling is fixed. The grate is an ordinary one, but tapering outward. The neck is made to lift easily up and down, and has a door at the end to charge the molten iron, and also "spy" holes through which to watch the action of the iron. The side of the firing chamber has a door to admit a moveable circular trough in order to pour molten fettling through the bridge end of the chamber. The fettling is composed of mill tap, pottery mine, purple ore, roll scale, &c., cast into the side, and is built in blocks properly molded against the ends, the whole being cemented together by "molten tap" into one smooth and regular form. The fettling, I should state, is melted in an air furnace, which adjoins the puddling furnace, and which is always kept hot. The stack of the ordinary description, and may be connected with a boiler. On one side and opposite the fettling furnace are two cupolas. The molten iron is conveyed by rail direct to the furnace in a pot, and when opposite the furnace, the neck piece is raised, and the iron tilted in, the time occupied being in the case witnessed six minutes. Whilst the iron is being admitted, the furnace is caused to revolve, so as to prevent the fettling being damaged, and to hasten the puddling. Mr. Spencer informed us that it took the following quantities to produce a ton of iron:

	tons.	cwt.	qrs.
Pigs.....	0	13	2
Coal (not including heating and fettling).....	1	5	0
Fettling.....	1	5	0
Mill Tap.....	4	0	0
Pottery Mine.....	0	0	0
	0	0	0
	6	0	0

The coal included the cupola, but did not include the melting of the fettling or the propulsion of the engines. The charge is said to be 1 ton 5 cwt. per heat, and seven heats may be done per turn. The heat we witnessed occupied six minutes to charge, thirty minutes to boil and ball, and twenty-five minutes to draw. One ball was made, but divided into four by means of huge tongs on wheels, which are tightened by a chain in connection with a ship's steam winch. When tight the furnace revolves, and the piece laid hold of by the tongs breaks off and falls on to a trolley, by means of which it is conveyed to the steam hammer, bloomed, weighed, and rolled off. The heat witnessed consisted of four blooms, weighing in the aggregate 15c. 1qr. 15lb. The average make during the last twelve months has been 45 tons per week. Mr. Spencer says that 50 tons is equal to old cost in production, but that above that there is a large gain. The men employed at the furnace number 16, each of whom average from 6/6 to 2/6 per shift; but many of them can be utilized for more furnaces, thus reducing the number to about six per furnace. Samples of iron made by the furnace, tested at Woolwich, were shown about half inch diameter, which had borne a tensile strain of 29 tons per square inch; and others showing the fibrous nature of the iron. It may be remarked that all the drossings are melted in the fettling furnace, and that no cinder is tapped out. After the balls are drawn the fire is fettled with several shovels of cold fettling, and molten fettling as required.

Proceeding from Hartlepool to Middlesbrough, we visited the Britannia Iron Works, of which Mr. J. Thomas is the manager. These, as all who have been in the North know, are most extensive works. They consist of one hundred and twenty puddling furnaces, mostly attached to vertical steam boilers. Steam hammers only are employed; and the rail mills are after Brown's patent, i. e., a double set of rolls, enabling rails 80 lbs. per yard to be rolled in two lengths; and blooming rolls with side rolls. The whole is very ingenious, and no doubt permits of more work being done, and that with greater speed and ease. But the objection to it is that occasionally the bloom sticks in, and thus causes inconvenience. The heating furnaces are on Siemens' principle, and the reheating on the old plan, with vertical stack boilers. The make is about 140 tons per shift in one mill.

Adjoining these works are the four blast furnaces of Messrs. Gyers, Mills & Co. These furnaces are 85 ft. high, by 26 ft. across the boshes. The pressure of the blast is 5 lbs., and the heat 1200 to 1300. All of them have bell tops; and the gases are taken off and utilized under the boilers, and for heating the blast stoves on Gyers' patent. The lift is vertical, and is worked very simply by an air engine. The ironstone is calcined in kilns. The limestone is emptied into circular iron tanks, and the coke into large oblong wooden boxes, placed in a row, and fitted with valves, through which the material drops into barrows. The trucks are raised at one end by means of an air pump, and the fall on the level above causes them to move rapidly to the kiln required, and when empty to move on to the opposite end, where they are lowered by an air drop instantly so as to move off by a switch on to the line for empties. Mechanical contrivance does everything; there is not a horse on the premises, and only about five men are required to each blast furnace to charge the material. In connection with the tuyeres there is a small eyelet faced with calx, through which the manager can see the color of the blast.

At the large works of Hopkins, Gilkes & Co., we saw in operation two of Danks' puddling machines, and two others in course of construction. The cupola not being complete, or the two furnaces not being sufficient for the melting of the metal in them, the iron had to be melted in the Danks furnace, which process occupied about an hour. The charge was stated to be about five cwt., and as soon as the iron was melted the furnace was caused to revolve. About six minutes after it was stopped, and about an ordinary cinder wagon was tapped off; the theory of this proceeding being that a greater part of the impurities were drawn out. The machine was once more set in motion, and in 25 minutes the iron was balled and ready to draw. The neck piece was then removed, and a large fork introduced under the ball; the furnace made half a turn and the ball fell on to the fork. It was next drawn out and taken on a trolley to a huge squeezer, with a horizontal steam hammer attached to hammer the ends, which it did most effectively and rapidly. From the squeezer and hammer, the bloom was taken to a reheating furnace, hammered, and rolled into puddled bars. The fettling of the furnace consisted of pottery mine and best tap, about 3 cwt. per ton, and about 2 cwt. of elmanite, very rich, and of the appearance of lead ore. The number of heats done per day was seven, of 5 cwt. each. The bloom which we saw drawn weighed 5 cwt., 2 qrs. The royalty charged is £210 per furnace. The squeezers cost £1500. As to the adaptability of the invention to iron making purposes in this country, the impression made upon us was that the Danks is a good method of puddling for common work; but that before it will do to be used in the manufacture of the best brands, steam hammers will have to be specially designed to hammer the cinder out. We were informed that upon breaking a bloom the cinder was often found embedded all round, and in a hollow in the center. I gave the statement as it was told us; I did not see any bloom broken, and do not therefore speak from ocular demonstration.

At the Teeside Ironworks (Messrs. Gilkes,

Wilkes & Pearse), we were shown a German invention for reducing the cinder while hot to powder, which is then made into bricks by being pressed into molds by hydraulic power, or else used as a concrete mixed with one-seventh of lime. The machine consists of a revolving drum about 14 ft. by 2 ft., with shelves inside to pick up and reduce the cinder. The drum was half filled with water, into which the hot cinder poured direct from the furnaces. The cold water, aided by the revolving of the drum, reduced the cinder to the gray powder referred to above. On the opposite side of the drum a trough is fixed into which the powder dropped, whence it is delivered to a truck for removal. At another furnace a process for attaining the same purpose, by different means, was shown us. Here the hot cinder ran on to a revolving disc, measuring 14 ft. by 2 ft. 6 in., without flanges, a jet of water broke it up, and a fixed rake pushed it into a truck adjoining. Large quantities of cinder thus dealt with were, we were told, sold to railway companies for ballast and concrete, at 1/6 per ton. Certainly these northern men know how to make the best of everything.

Our next visit was to Messrs. John Brown & Co.'s works, the armor plate mill of which is so well worth seeing. This consists of two pairs of rolls, each roll weighing 17 tons, and four heating fires, about 26 feet square, with two stacks to each. The furnaces are about one foot above the level of the rolls, between which is a 4 feet gauge line, with wagons to match. The rolls are connected with a reverse motion, the altering of which is effected by a lever. As soon as the slab, which was formed of 5 ft. 2 in. plates "sheared," was sufficiently heated, a hook was passed over the top and made to press against the back of the slab. This hook was attached to a chain, one end of which was fastened round the top roll. The machinery was set in motion, and the slab was rapidly drawn on to the wagon which stood below. The wagon thus freighted was allowed to run down the line, and bunt, so to speak, against the roll plate, while the enormous slab being seized by the rolls passed through them and landed on a trolley on the other side. The mill was then reversed, and the slab was again forced between the rolls by prying the trolley with a crow bar. In order to raise the plate from the entrance of the rolls, so as to turn it, a block of wood is inserted between the holes, the machine is set in motion, and the block pushes the plate forward to the required distance. In this manner the plates are rolled with the greatest ease, and with very little noise or excitement. When cool they are removed to the planing shop, and the sides and ends cut off, either by vertical or horizontal planes, to the required size. We saw plates 14 inches in thickness, and were informed that the company had received an order for 20-inch plates, the thickest yet ordered. From the armor plate mill we proceeded to the Bessemer foundry, where we witnessed the casting of 7 cwt. ingots for wheel tires. Each cast weighed 6 tons, and we were informed that the two converters we saw were capable of turning out 1000 tons per week, and inasmuch as the works have six converters, they are able to produce 3000 tons of Bessemer steel per week, which are worked up into tires and rails. The tires are prepared as follows: The steel ingot, after being heated, is hammered down into a circular form about 1 ft. 6 in. by 6 in. A hole about 4 in. diameter is punched out and widened to about 6 in. under the steam hammer. It is then reheated, taken to the rolling machine, and rolled off into a tire. The whole process, not including the time of reheating, occupying about ten minutes. We also witnessed the manufacture of weldless tires of wrought iron, the process being similar to the steel tires, except that the circular blooms were in this case prepared from a coil of iron hammered together in the manner adopted in the manufacture of Armstrong guns. The company are large manufacturers of steel spring and other goods, but time did not allow us to see more than we have described. We were informed that about 6000 men are employed, and there appeared to be no slackness of work. We were conducted over the works by Mr. Davies, the manager; and at all points received the most kind and flattering attentions.

This finished our peregrinations. Everywhere we were received with the greatest cordiality. The men of the North are proud of their great works, and are by no means loth to show technical visitors over them. All the modes of working in vogue in the North are not suited to the circumstances of South Staffordshire; but, nevertheless, Staffordshire men may learn much by a visit to Durham and Yorkshire. It will at any rate give a clearer apprehension of the character of the competition which they, in this ancient seat of the iron trade, have to reckon upon in the iron markets of the world.

The two companies, organized respectively in Illinois and Missouri, to build a bridge across the Mississippi River at Quincy, have been consolidated, and will push the work forward without delay. It is to be a railroad and wagon bridge, and is to be open to all railroad companies desiring to use it. The surveys have been completed and the plans prepared. The plans provide for a bridge from the foot of Delaware street, Quincy, to the northern end of Goose Island, the bridge having eleven piers and two abutments, the draw being placed close to the Illinois shore. From Goose Island to the Missouri shore trestle work will be used.

A new blast furnace is now approaching completion at Port Henry, and will be blown in before cold weather. It is the first furnace to go into blast in the United States, with the new hot blast fire brick stoves. The leading feature of this invention consists in the largely increased temperature of the blast which the stoves can withstand, and the consequent decrease in the quantity of fuel consumed in operating the furnaces to which they are attached. It is affirmed that with these stoves a temperature of 3000° can be sustained without risk of damage. At present 19 furnaces in Great Britain, France and Luxembourg have been fitted with 58 of these stoves, while 39 furnaces, with 151 stoves, are now being constructed, of which 7 furnaces and 25 stoves are in this country.

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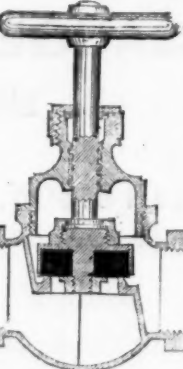
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3d and 3d Fine, Trunk, Clout, and Cane Box Nails; 2d
and 3d Fine, Trunk Nails; Zinc, Iron, Copper and Steel
Shoe Nails; Brads and Patent Brads; Glaziers' Points,
&c., &c., &c. **COPPER BRASS AND IRON**
RIVETS, of all kinds. Copper Rivets, from 1/4 to 6d,
in casks of 100 lbs. each. Hose, Belt and Shoe Rivets
and Nuts. Oval and Counterbore Heads of extra
lengths, made to order. **SHIP AND BOILER RIVETS**
OF ALL SIZES AND LENGTHS

Established in 1810.

HOBART'S TACKS.

Manufactured by

Dunbar, Hobart & Whidden,

Office and Salesroom,

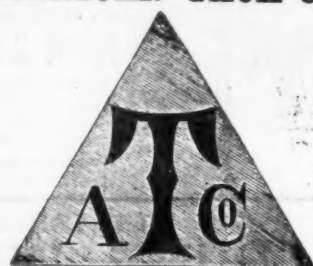
116 Chambers Street, N. Y.

Factory, SOUTH ABINGTON, MASS.

Manufacturers of

American, Swedes and Copper Tacks, Tinned,
Leathered and Large Head Tacks, Finishing Nails,
Black and Tinned Trunk Nails, 2d, 3d, 4d, 5d, 6d,
and 7d Fine, Trunk Nails, Hungarian, Chair, Cane Box
and Barrel Nails, Glaziers' Points, Iron, Steel, Copper,
Zinc and Brass Shoe Nails, **HEEL and TOE**
PLATES, STEEL SHANKS, and
FANCY HEAD NAILS, SILVER or
JAPANESE LINING and SADDLE
NAILS.

A full assortment always on hand at salesrooms,
for immediate delivery if required.
Old and irregular sizes made to order or cut from
sample at short notice. Send for Price List.

AMERICAN TACK Co

MANUFACTURERS OF

Copper, Swedes, and Iron Tacks,**BRUSH, LACE AND GIMP TACKS,****Leathered, Tinned, and Iron Carpet Tacks; Fin-****ishing, Black, and Tinned Trunk Nails****Hungarian and Cane Box Nails****COPPER and IRON BOAT NAILS****ZINC, COPPER, STEEL, and IRON SHOE NAILS****2d and 3d FINE NAILS;****Bright and Tinned Roofing Nails,****BRADS, PATENT BRADS, &c.**

Factory, Fairhaven, Mass.

Salesroom, 117 Chambers Street, NEW YORK

N. B.—Any variation from the regular size or shape

of the above named goods cut from sample to order.



Putnam's Government Standard

FORGED

HORSE SHOE NAILS.

Manufactured from the best of NORWAY Iron,

and warranted to give entire satisfaction.

S. S. PUTNAM & CO.,

NEPONSET, MASS.

Alexander Brothers,

Manufacturers of OAK TANNED

Leather Belting

412 North 3d, Philadelphia, Pa.

WM. H. STOYLE.

MANUFACTURER OF

Machine Cut Belt Lacing.

No. 403 Library Street,

BRADFORD & SHARP,

Manufacturers of

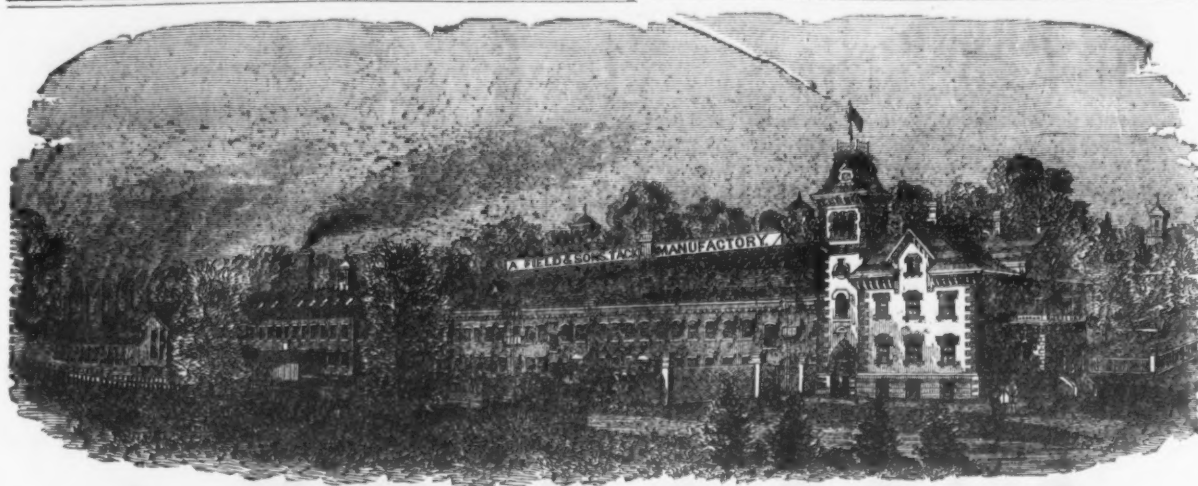
Leather Belting**OAK TANNED,**

57 Walnut Street, Cincinnati, O.

We furnish many of the largest Iron Mills in the

West, and guarantee quality of all goods sold.

Send for prices.



A. FIELD & SONS,

TAUNTON, MASS., Manufacturers of

Copper and Iron Tacks, Tinned Tacks,

SUPERIOR SWEDS IRON TACKS, for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

American and Swedes Iron Shoe Nails,

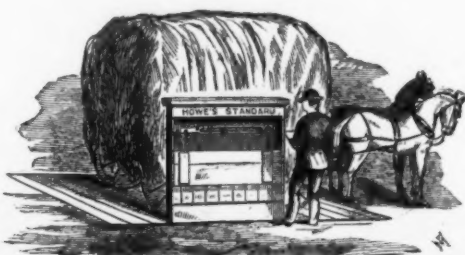
Zinc and Steel Shoe Nails, Carpet, Brush and Gimp Tacks, Common and Patent Brads, Finishing Nails, Annealed Trunk and Clout Nails, Hob and Hungarian Nails,

Copper and Iron Boat Nails, Patent Copper Plated Tacks and Nails
Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks, Glaziers' Points, etc., etc.

OFFICES AND FACTORIES AT TAUNTON, MASS.

WAREHOUSE AT 35 CHAMBERS STREET, NEW YORK, where may be found a full assortment of Tacks, Brads, &c. for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above named goods made from samples, to order.



HOWE'S STANDARD SCALES. SAMPSON STANDARD SCALES.

Weighmasters' Beams and Frames. Trucks of all varieties.

All descriptions and sizes of these articles are made by the

Brandon Mfg. Company, at Brandon, Vt.

And sold by their Agents in all the leading cities and towns of the country. The Scales made by this Company possess valuable patented improvements over all others. They have taken more first-class Premiums than all others during the past ten years. The Brandon Manufacturing Company guarantee all goods made by them to prove satisfactory and superior to any other make. Call and examine their goods, or send for Circulars and Price Lists to

The BRANDON MANUFACTURING CO., BRANDON, VT.,

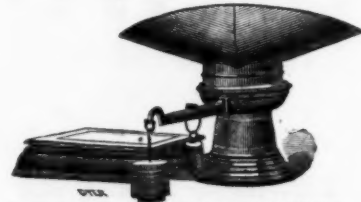
Or their Warehouses and at the following places:

AGENTS.

AGENTS.

PAGE & CO., 3 Park Place, New York.
E. H. SOUDER, 1021 Market St., Philadelphia, Pa.
W. A. McCLURG, 63 Wood St., Pittsburgh, Pa.
SPEAR BROS., 41 S. Charles St., Baltimore, Md.
W. M. BIRD & CO., Charleston, S. C., and Savannah, Ga.
FOLGER & COMPANY, 37 & 39 Magazine St., New Orleans, La.
BRANDON SCALE CO., 53 Sudbury St., Boston.
W. A. DOBSON & CO., 86 Main St., Buffalo, N. Y.
HEART & CO., 181 River St., Troy, N. Y.

LYMAN, DORNEY & Co., 116 Main St., Cincinnati, O.
St. Joseph, Mo.
A. M. GILBERT & CO., 38 State St., Chicago, Ill.
BUHL, DUCHARME & CO., Detroit, Mich.
ARNOLD & YALE, Milwaukee, Wis.
KINGMAN & CO., Peoria, Ill.
JOHN T. EDGAR, Omaha, Neb.
GILBERT, WEEKS & CO., 11 South Main St., St. Louis, Mo.
V. S. W. PARKHURST, 318 Pine St., San Francisco.
EVANS & SON, 14 St. John St., Montreal, C. E.



With one Square and one Round Platform.

DIRECTIONS FOR USING

L. B. Taylor's Patent Speed Indicator.



To ascertain the number of revolutions made by a shaft in any given time: Take the Indicator by the handle in the right hand, holding your watch in the left, press the point of the spindle gently against the end and center of the shaft. To every hundred revolutions of the shaft the Hundred Pointer will make one revolution, while the Thousand Pointer will indicate one number, the dial being marked into ten parts. It may be applied to a shaft revolving either to the right or left.

Manufactured only by CONN. CUTLERY CO., NAUGATUCK, CONN.

TO WHOM ALL ORDERS SHOULD BE ADDRESSED.



OTIS FURNACES & MINES.

New Union Steam Safety Elevator,

How One Works.

RIVERSIDE IRON WORKS, DEWEY, VANCE & CO., Wheeling, W. Va., January 14th, 1873.

Messrs. OTIS BROTHERS & Co., New York.
Dear Sirs: The experience of a year proves that your Furnace Elevator is superior to all others in use. We have in the six weeks from December 1st to Sunday last, 12th inst., made 2734 tons, 1401 lbs. Pig Metal, or an average of near 65 tons per day, which required the elevator to lift 723 feet high 4 1/2 tons Ore, Coke and Limestone for each ton of metal produced, or more than 11,500 tons material in the 6 weeks. The largest yield in one day was 51 1/4 tons Iron, involving the lifting of 345 tons material in 24 hours. This has all been done to our satisfaction, and that, too, in the coldest weather we have had. Other furnaces with water and pneumatic hoists have experienced great difficulty, on account of the water freezing in the tanks; and in the case of the air hoists, we understand that two furnaces, not far from us, had to "blow out," from being unable to hoist stock during the "cold snap." The difficulty, we are told, was caused by the condensed moisture in the blast freeing to the sides of the cylinders, so that the piston could not move up or down. Very truly, yours,
DEWEY, VANCE & CO.

Send for Circular to

OTIS BROTHERS & CO.
348 Broadway, NEW YORK.

DEMAREST, JOYCE & CO.,
Iron Founders,
MACHINISTS,
and Manufacturers of
Sewing Machines,
Steam Fittings,
AND
LIGHT WORK of all kinds.
ALSO
Plain and Ornamental
Japanning.

20 to 30 Morton, and 57 to 65
Clymer Streets,
BROOKLYN, E. D., N. Y.

EAGLE IRON FOUNDRY.

EAGLE IRON FOUNDRY.

BUSINESS ITEMS.

NEW YORK.

A large firm of car builders on Green Island, near Troy, has just completed \$80,000 worth of cars for a South American railroad, and \$140,000 worth for the Canada Southern Railroad, but has received instructions from both companies not to send the cars at present, as they cannot pay for them.

The Troy Bessemer Steel Works, of John A. Griswold & Co., continue work with full force, having reduced wages 10 per cent. They employ about 500 men.

O'Hara & Co., boiler makers, of Long Island City, employ twenty men at present, paying full wages and working full time. They ordinarily employ sixty-five or seventy-five men.

PENNSYLVANIA.

The Oley Furnace, in Berks county, which was blown out about four weeks since for repairs, resumed operations on the 25th ult., and is now in full blast.

Messrs. Morgan & Orr, of Philadelphia, have just completed a coining press for the San Francisco mint. It weighs 18,000 lbs., and is intended more particularly for coining the new silver trade dollar. The machine is two and a half times beyond the capacity of any other coining machine that the firm have yet made for the government, and is capable of striking eight twenty-dollar gold pieces or twenty silver trade dollars per minute. The mint machinery for the San Francisco Mint, in addition to that already noticed, the machinery for the United States Branch Mint at Carson City, Nev., the Peruvian Mint, at Lima, the Bolivian Mint, at Chuquisaca, and for the various branch mints in Mexico during the reign of the Emperor Maximilian, were manufactured by this firm.

The Fishbach Iron Mills, in Pottsville, are again in operation.

The Tantaqua Item says: We are sorry to learn that orders have been issued by the Lehigh Company for the suspension of the Greenwood colliery throughout the whole winter. The Greenwood has always been one of the mainstays of our town.

The Allentown Chronicle says: The pig iron trade in the Lehigh Valley is extremely dull. The prices offered are generally below the cost of manufacture, and the iron masters see that if they run full time all winter, they would have such an immense stock on hand in the spring that the trade would be ruined for the whole of next year. Consequently nearly every company has blown out enough stocks to reduce its production about one-half.

It is rumored that all the collieries of the Philadelphia and Reading Coal and Iron Company will be suspended this winter, with the exception of four.

The Catawqua Dispatch wants it distinctly understood that the Craze Iron Works will be kept in blast probably longer than any other furnaces in the Lehigh Valley, and that because all their iron is marketable and no difficulty is experienced in selling it.

The Pittsburgh Locomotive Works are building ten 48-ton "consolidation" engines for the Baltimore and Ohio Road. They are also at work on orders for the Toledo, Wabash and Western and Indianapolis, Peru and Chicago. The orders on hand are mainly from old companies.

The Union Boiler and Sheet Iron Works, Schaal, Hoeveler & Co., occupies 18,000 square feet of ground, bounded by the Allegheny River, the A. V. R. R. and Thirty-second and Thirty-third streets. This firm employ 117 hands, and have made this fall 13 large oil tanks, 60 to 80 feet in diameter, beside a large amount of boiler work.

The Trenton Iron Works are working to their full capacity at present, manufacturing cast breaking rollers, engines, drift cars, &c. They work night and day at present.

Graff, Bennett & Co.'s large new plate mill, in Pittsburgh, is now successfully running, and turns out 14 tons a day.

The Isabella Furnace Company, who have coke works near Blairsville, gave orders a few days ago to heat up 40 additional ovens, making in all 280. The company have been shipping 300 tons of coke per day, which will be materially increased.

The Allentown Chronicle, of the 30th, says: The Glen Iron Works having received orders for iron, will resume work on Monday next. This information ought to gladden the hearts of our people to the same extent that the closing of the works caused them to feel despondent. These works also paid out small amounts to their hands yesterday.

About thirty men employed as helpers to the puddlers at the Lancaster Manufacturing Company's works, struck against a reduction of wages that was about being made. It seems that each puddler receives \$6.25 per ton, one-third of which amount he pays to his helper. In addition to this the helper has been receiving ten cents from the office for every heat, and it was this ten cents which the company proposed to strike off. The managers of the company are firm in their resolve to strike off the ten cents; so that the helpers have virtually struck themselves out of work.

MASSACHUSETTS.

The Ames Company, of Springfield, have, during the past season, manufactured and sold about 30 of the Martin brick machines, and in consequence of the number of orders received for next season, they will again begin the manufacture of them about January 1.

For some days 37 mills at Fall River have been running only four days each week and eight hours a day. This is infinitely better than stopping entirely. The remaining two mills have November contracts. These mills employ 14,000 operatives, and their monthly pay-rolls, when in full operation, amount to \$450,000.

The contract for making 250 coal cars for the Boston, Clinton & Fitchburg Railroad has been awarded to Osgood Bradley, of Worcester.

The Springfield Republican says: Smith & Wesson have given their contractors notice that on January 1 they shall cut down 10, and, in some instances, 15 per cent. on small work; that is, pistols for the trade. The contractors are to decide this month whether or not they can afford to go on with their work. The probability is that most will do so, although some probably cannot. The reduction does not apply to the Russian order.

CONNECTICUT.

The Middletown Tool Company has been in operation about 20 years, manufacturing a large variety of hardware, making a specialty of plane irons, which are made in a great number of

sizes and shapes. They employ about 45 hands.

The Winchester Rifle Company is filling an order from the Turkish government for 100,000 cartridges for the Martini-Henry gun.

The Greenwood Scythe Company, of New Hartford, is going to build a branch railroad from the Connecticut Western to its works.

When we consider the great number of wood screws that are used in all kinds of building throughout our country, it will be observed that it is no unimportant branch of productive industry to supply this demand. But few screws are imported. Most of the consumption is supplied by a few establishments located in New England. One of the largest of these is the National Screw Company, of Hartford, which we lately had the pleasure of visiting. This company began the manufacture of gimlet pointed screws of every kind about six years ago. When running full they employ 300 hands, and turn out 6000 gross a day. The largest of their buildings is a stately brick structure 250 feet long and 50 feet wide, five stories high. Next to this is another building, also of brick, 280 feet long, 30 feet wide, partly one and partly two stories high. The process of making screws is very interesting to observe, especially to one who is not familiar with the operations. At first the wire is passed through a self-feeding machine which cuts off proper lengths and heads them. These pieces are then passed through a machine that cuts a slot in the head, next through the threading machine. The National Screw Company have some 500 threading machines, and about the same number of slotters and shavers. They have a new machine in the shop that turns a smooth round head on the screw, and slots it at the rate of from 80 to 100 gross a day. It is self-feeding, and works almost automatically. The company have all the best and most improved machinery that can facilitate their business, and produce screws as perfect as any of the kind made in Europe or America. The product is mainly sold by the general agents, Russell & Erwin Manufacturing Company, at their several warehouses in the large cities. The screw company has a capital of \$500,000. The officers are Messrs. Wm. A. Healy, president, and Newton Case, treasurer.

MAINE.

The Wilder Foundry, at Belfast, has been fitted up by the Belfast Foundry Company, who lost their building by the recent fire. The company are now furnishing the works with all the necessary tools and machinery.

VERMONT.

Fairbanks & Co., of St. Johnsbury, are building one of their 60,000 pound track scales, with 34 feet platform and iron frame, for the Shepaug Railroad at Roxbury, Conn.

OHIO.

The Niles Chain Works have got into operation. When in full operation these works will give employment to fifty hands and turn out seventy-five tons per month, from the smallest size chains to large chain cables. Orders are coming in at a satisfactory rate. Mr. Brown, of the Niles Iron Company, is the manager.

The Valley Rail Mill, at Youngstown, resumed operations on the 3d inst., their late difficulties having been satisfactorily adjusted.

The monthly payroll of the Cleveland Rolling Mill Company amounts to about \$100,000. The company have paid their men in full, notwithstanding the momentary difficulties.

Brown, Bonnell & Co., of Youngstown, started their mill in full operation on Thursday last, and will continue running double turn all winter. They paid their hands in full on Saturday, in cash, and will continue doing so.

The Steubenville Herald and Times of the 31st ult. says: The millers at the Jefferson Rolling Mill resumed work this morning, and the rolling will commence on Monday. The mills have been stopped some days, as is known, for repairs.

An extensive manufactory for plows, wagons and all sorts of agricultural implements, is approaching completion at Zanesville.

RHODE ISLAND.

About two months ago, says the Providence Journal, a proposition was made to the Providence Tool Company to sell out their Turkish contracts for 600,000 rifles, and realize now a considerable portion of the anticipated profits. This was not only promptly declined, but was communicated to the agents of the corporation in Constantinople. The agents in their reply, just received, say: "Now about the remarkable contents of your aforesaid letter. This was, as we said, received on Thursday. We have immediately communicated it to His Excellency Hussein Arui Pacha (Minister of War), who had it at once translated into Turkish, and forwarded it forthwith to the palace, to be laid before His Majesty, the Sultan. The next day (Friday) after the usual ceremony of the Moslem, His Majesty requested His Excellency to see him, and said to him to request us to write to you that all these were the intrigues of parties who could not suffer—for reasons of their own emergency, and too jealous to see his soldiers armed so thoroughly in such a short time with one of the best weapons in existence. 'Tell them,' His Majesty added, 'that as I have ordered you to contract for one hundred thousand more, even before I saw a single gun, so I shall order four hundred thousand more at the first opportunity, which is not far off. Let them appreciate my confidence in them, and work in good earnest and good faith, as they say they will, without giving the least confidence to any such intrigues. On the contrary, let them feel assured that their loyalty will be fully appreciated by myself, and by the nation in general.'"

INDIANA.

A new industry has been inaugurated in the West—namely, the manufacture of pins. There is now a factory in operation at Valparaiso that turns out 1,500,000 pins a day, consuming 450 pounds of wire, which is made in Conn. The capacity of the factory will soon be doubled, and a wagon load of pins be turned out every 24 hours. An ordinary machine will make 120 pins per minute. This is the only factory of the kind west of New England, with the exception of a small one at Cohoes, N. Y., and it is said the pins made here are in no way inferior to those made in the East, or in England. The company that owns the factory—the National Pin Company—was organized last spring. Following are the officers: George Powell, president; A. Waring, secretary; William Powell, treasurer; E. Fontaine, superintendent. Two of the officers are practical men. All their machines were manufactured by themselves and in the building where they are used, under the superintendence of Mr. A. Fontaine, a brother of the superintendent, a practical machinist of much experience and ingenuity.

MISSOURI.

The machine shops of the St. Louis, Kansas City and Northern Railroad Company, at Moberly, are nearly completed. The buildings consist of a machine shop, 121x219 feet; blacksmith shop, 110x125 feet; tin shop, 30x70 feet; foundry, 60x200 feet; main offices, 60x100 feet; the main shop 81x241 feet; planing mill, 75x200 feet; car shop, 85x200 feet; dry house, 20x40 feet; carpenter shop, 30x60 feet; and lumber shop, 4x114 feet. Beside these, there are many smaller buildings, such as an oil house, gas works, pattern house, brass foundry, iron house, etc.

The round house of the St. Louis and South-eastern Railroad, at East St. Louis, together with two locomotives, were burned Oct. 31. The loss is about \$40,000; insurance not known.

HENRY DISSTON & SONS'

SAW, TOOL, STEEL AND FILE WORKS,

Front and Laurel Streets,

PHILADELPHIA, PA.

H. W. PEACE,

MANUFACTURER OF

SAWS OF ALL KINDS.

FACTORY, WILLIAMSBURG, N. Y.

AMERICAN SAW CO.,

No. 1 FERRY STREET, NEW YORK.



Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking. This is especially the case with cross cuts having Patent Teeth. In the perforated saws all gumming is avoided, and the teeth are easily kept long and in proper shape, saving files, labor, expense and vexation. As is well known, our saws cut faster, smoother and easier than any other.

MOVABLE-TOOTHED CIRCULAR SAWS AND SOLID SAWS OF ALL KINDS.

GEORGE GUEUTAL,

39 West 4th St., New York.

IMPORTER OF

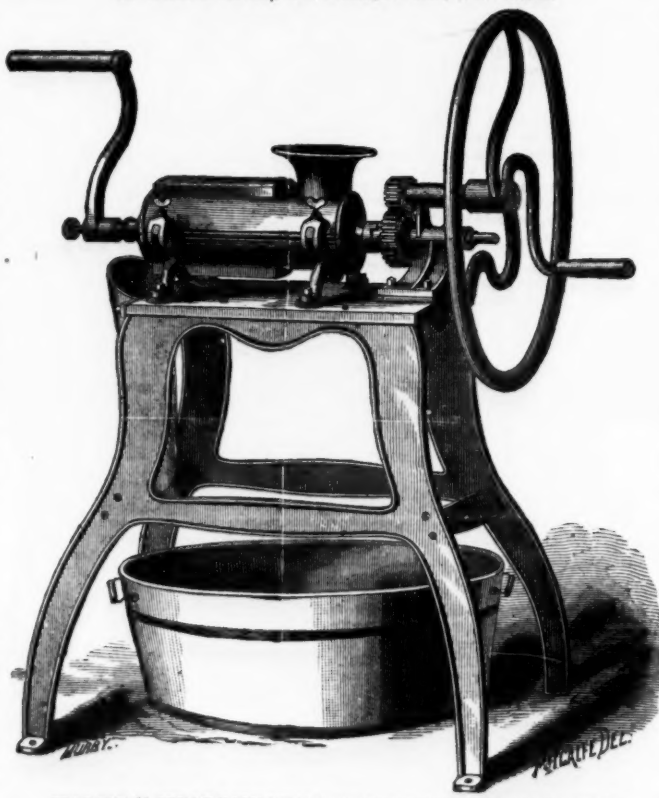


Wood Screws, Steel in Sheets,
BAND SAWS, TOOLS FOR BRAZING, &c.
Bed Screws, Pin Hinges, and Wire Nails a Specialty.

VULCAN MANUFACTURING CO.,

61 Warren Street, cor. College Place, New York.

Manufacturers of MILES' CHALLENGE FAMILY & BUTCHERS' MEAT



CUTTERS & BUTCHERS' MACHINERY, TOOLS & FIXTURES of every kind.

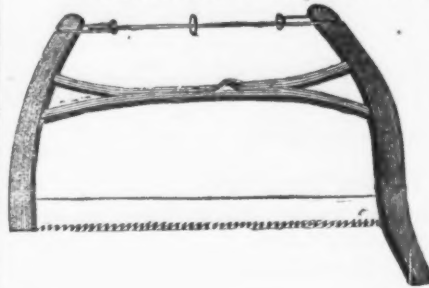
MILES' "CHALLENGE" BUTCHERS' MEAT CUTTER.

LETTER C, WITH IRON FRAME AND FLY-WHEEL-GEARED. This Machine can be used by one or two persons. It is the favorite Machine for hand, and will cut from 100 to 200 lbs. of meat per hour. In the operation of the Butchers' Meat Cutter, the revolving knives, with their sharp edges, work past the stationary ones, in close contact with them, like the two edges of shears. A perforated steel plate, with its surfaces ground perfectly true, is placed near the outlet of the Machine and prevents the meat from leaving it until it is cut to the proper degree of fineness. This is regulated by the size of the holes in the steel plate, through which the meat must pass before being discharged. Separate revolving knives, fitted for that particular purpose, shear close to steel plate, on each side of it, and, as the meat passes through the holes in the plate, cut perfectly fine all the strings which may chance to get past the other knives. The machine is strongly made and compactly arranged, and works noiselessly. When used with power it can be driven at a high rate of speed and cuts with great rapidity.



Hankins' Elliptic Forked Saw Frame.

Patented June 28th, 1870.



The enclosed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any centre bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE
VULCAN SAW WORKS,
WILLIAMSBURG, N. Y.

W. ROSE & BROTHERS

WEST PHILADELPHIA,
Manufacturers of

Plasterers' and Brick
Trowels

Hammers and Chisels.

ALSO,

Saddlers' Round Knives etc.,

N. E. cor. 36th & Filbert Sts.

Please send for Price List.

E. C. ATKINS & CO.,

Indianapolis, Indiana,
Saw Manufacturers.

Best Cast Steel Patent Ground Saws.

Also, sole Manufacturers of Atkins' Patent



CROSS-CUT SAW HANDLE.

Best Patent Handle in use.
Manufacture and Office—Nos. 210, 212, 214 and
216 South Illinois Street.



I make a specialty of the LARGEST SIZES of Circular Saws, and call particular attention of lumber manufacturers to the following points of excellence: Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself, who has devoted over twenty years to the art of saw making.

I am sole proprietor and manufacturer of the celebrated "Challenge" Cross-Cut Saw. Price Lists of all kinds of saws sent on application.

JAMES OHLEN.

J. FLINT & CO.

Manufacturers of all kinds of SAWS and PLASTERING TROWELS.
ROCHESTER, N. Y.

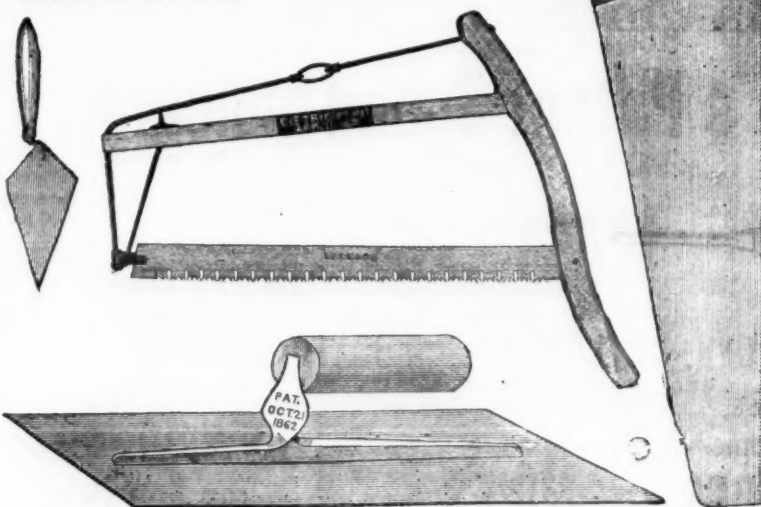
Dietrich's Patent Wood Saw. Guaranteed the strongest, lightest, easiest to strain or tighten and best braced wood saw made; also to give perfect satisfaction.

Dietrich's Patent Double Handle Rip Saw. All will readily see the benefit of this useful invention.

J. Flint's Patent Plastering Trowels. The best made and finished Trowels in the world. We make four grades of Plastering Trowels, from the best to the cheapest.

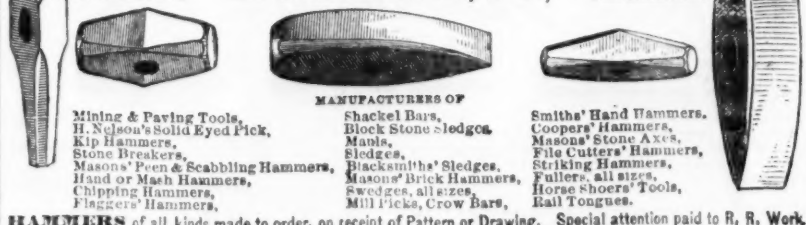
Our patent method of grinding hand saws makes them superior to any in the market.

Send for Illustrated Price List.



NELSON TOOL WORKS,

Trade Mark. H. NELSON. 157 East 32d Street, N. Y., Trade Mark. H. NELSON.



MANUFACTURERS OF Mining & Paving Tools, H. Nelson's Solid Eyed Pick, Kip Hammers, Stone Breakers, Masons' Peen & Scabbling Hammers, Hand or Mash Hammers, Chipping Hammers, Flaggers' Hammers, Shovel Bars, Block Stone Sledges, Mania, Sledges, Blacksmiths' Sledges, Masons' Brick Hammers, Swedges, all sizes, Mill Picks, Crow Bars, Smiths' Hand Hammers, Coopers' Hammers, Masons' Stone Axes, File Cutters' Hammers, Striking Hammers, Fullers, all sizes, Horse Shoers' Tools, Rail Tongues.

HAMMERS of all kinds made to order, on receipt of Pattern or Drawing. Special attention paid to R. R. Work.



BOYNTON'S LIGHTNING SAWS.

Awarded the Medal of the American Institute, 1872.



Two Direct Cutting Edges, instead of one Scraping Point. Note extra steel and durability over the old V, outlined on W tools.

A Challenge of \$500, toward expense of a public test, to prove that the Lightning Saws excel all others in Speed, Ease, and Simplicity, has been offered since 1870, and has never been accepted. More than 100,000 Lightning Saws were sold during the year 1872, the purchasers of which testify to their superior merits.

Our leading papers, such as the Tribune, American Agriculturist, Christian Union, etc., have published over fifty editorial notices recommending these Saws. Farmers' Clubs, Lumbermen, and Hardware Dealers unite in pronouncing the genuine Lightning Saw the greatest labor-saving implement of the age.

I have hundreds of letters from practical sawyers, voluntarily written, expressing their entire approval of these Saws.

Where the Hardware Trade do not sell the Lightning Saw, I will send a 6-foot cross-cut and a buck saw-blade on receipt of \$6.

For Catalogue and additional information, address E. M. BOYNTON, 80 Beekman St., New York, Sole Proprietor and Manufacturer.

WM. McNIECE, Excelsior Saw Works.

515 Cherry St., Philadelphia.

Manufacturer of

Extra Cast Steel Saws of every description,
Pat. Screw Socket Pole Pruning Saws,
Patent Screw Socket Edging Knives,
Patent Screw Socket Scuffle Hoes, and
Patent Screw Socket Paper Hang-

ers' Scrapers,
Mowing Machine Sections of all patterns
constantly on hand.

WHEELER, MADDEN & CLEMON,

Manufacturers of Warranted Cast Steel

SAWS

of every description,
including

Circular, Shingle, Cross Cut,
Mill, Hand, Roberts' and
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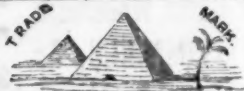
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PEN AND POCKET KNIVES,

MANUFACTURED BY PEPPERELL,
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FLINT AND EMERY

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The Lake Superior Iron Region.

III.

Leading from Humboldt in a southerly direc-
tion, a branch road, 8 miles in length, has been
constructed to the famous

REPUBLIC MINE,

at Smith Mountain. This mountain has been
for some time past a familiar feature in the
topography of the country, but was, until
recently, thought to be composed entirely of
the same worthless "mixed ore" formation
which constitutes the well known Cleveland
Knob. It is situated upon the south side of
the Michigamme River, at a point where it
widens into a small lake, and stands out boldly
from the surrounding scenery, at a height of
nearly 500 ft. above the water level, its sides
and upper surface being perfectly bare and
smooth, presenting, at first sight, the appear-
ance of a solid mass of iron ore, and even upon
a near approach it is difficult for the ordinary
observer to realize that the greater portion of
what he looks upon is so much contaminated
with quartz as to be practically of no value at
present.

Although the main body of the ridge is thus
constituted, a very large deposit, entirely free
from quartz, has been discovered resting
against its north face, which in richness and
purity will surpass anything of the kind else-
where in the known world, consisting of sepa-
rate seams of the purest specular and magnetic
ore, of which only the former is at present
mined.

Entering one of the openings now in opera-
tion, one is confronted by a face of this specular
ore, as glittering and splendid as a wall of
metallic silver, the virgin purity of its surface
unblemished by seams of rock or inferior ores,
but as uniform throughout as the most care-
fully refined metal. Here are specimens for the
mineralogist by the car load, and really it seems
almost like vandalism to surrender it to the un-
satisfactory cravings of the devouring furnace.

In attempting a more technical description of
the deposit, it may be stated that the whole ac-
companying formation dips to the north, at a
nearly vertical angle, the overlying rock, which
forms the bed wall of the lake, being a quartzite,
below which comes the magnetic ore seam, then
a narrow seam of talcose schist, next the specu-
lar ore seam, which is divided in the center by a
thin seam of schist, absent in places, then the
mixed ore formation of considerable thickness,
and, finally, the dionite. A gradual erosion has
carried away the upper part of the material,
from the margin of the lake to the face of
mixed ore, thus giving the latter prominence.

At the western extremity of the lake the
whole formation turns sharply around to the
northward, forming a horseshoe curve, in the
center of which the ore seams attain their
greatest width, about 75 feet for the specular,
and 25 feet for the magnetic. From this point
they narrow rapidly in both directions, a few
hundred feet to the eastward the former being
only about 6 feet wide, and further on appar-
ently thinning out entirely, connecting, however,
at one point, by a leader, with a deposit of the
pure material some 6 feet wide and 25 feet
long, lying in the mixed ore formation. At the
northwestern extremity they grow thinner
gradually, until the bluff is entirely cut out by
the river.

One of the most important points to be noted
in connection with the deposit is its extremely
favorable location, by which its value is en-
hanced beyond measure, on account of the
little expense involved in opening it up. The
ore seams outcrop at nearly the summit of the
ridge, at a height of 300 feet above water level,
or 150 feet above the grade of the railroad. By
driving tunnels to them at various points, at a
slight elevation above the railroad, it is obvious
that they may be worked for many years to
come, with no expense for hoisting and drain-
age. This is now being done at one point,
though the greater portion of the ore now
quarried is taken out at the top of the hill, and
run down inclined planes to the railroad
pockets.

The ore can also be exploited with great
facility. It lies in a compact and well-defined
seam, free from rock, and is so soft as to be
easily drilled. Owing to its conspicuous ap-
pearance, it is readily freed from foreign ma-
terial, and is therefore sent to market in a far
cleaner state than any other in the region, com-
manding a greater price on that account. It is
also considered to surpass them all in excellence
of quality, being almost perfectly free from
sulphur, phosphorus, and other ingredients of
a deleterious nature, and therefore much
sought after for the manufacture of Bessemer
metal.

The total shipments up to October 4, this sea-
son, were 74,162 gross tons, over 1000 tons hav-
ing many times been shipped in a single day.
The stock of this mine now commands a pre-
mium of 500 per cent., there being 20,000 shares,
valued at \$125 apiece.

Across the river to the eastward from the
Republic Mine, and some distance away, is the
Kloman property, where the ore seams outcrop
at the general level of the country, and are now
being opened up. The same ores occur here,
and are nearly equal in quality to those of the
Republic, but the deposits as yet developed are
not so well defined, and free from admixture
with quartz. The property is, nevertheless,
considered to be a very valuable one. The
shipments for the season up to October 4
were 16,112 tons, mostly consumed by the Lucy
Furnace, of Pittsburgh.

Going back to the main line of the M. H. and
O. R. R., we travel westward for a distance of
five miles, before reaching the next developed
property on the belt, that upon which the cele-
brated

CHAMPION MINE

is situated. At this point the seam outcrops in
a nearly east and west direction, at the surface

of an elevated plateau, about a mile to the
south of the railroad, dipping to the north at
a nearly vertical angle, and having a compara-
tively uniform width of 50 to 60 ft., but, like
the Republic, divided in places by a central
seam of talcose schist.

The underground system of mining was at
first attempted here, but has been only partially
carried out. Four shafts have been sunk upon
the seam, at intervals of 300 ft. or more, and
levels made every 60 ft. in descending, worked
in the same manner as at the Edwards, but in
most places the seam has been worked out en-
tirely to the surface, leaving arches at various
points, and timbering where necessary. Some
of the shafts are now down to the fourth level.

In the eastern portion of the workings the
seam is composed entirely of magnetic ore,
varying in structure from coarse to fine grained
and steel, the fine grained being most abun-
dant. Recently a soft bluish variety of the
latter has been found. Considerable bisulphide
of iron, or pyrites, is found in places, lying
near the foot wall, but is usually restricted to
a certain well defined area. Between shafts
Nos. 2 and 3 the magnetic ore is entirely cut
out by a specular seam, or perhaps it may be
said to become suddenly changed in character,
passing into the form of specular ore, as by
many scientists the latter material is believed
to be but a modified form of the first, contain-
ing a larger percentage of iron than is justified
by the formula of the hematite class. The
two are considerably intermixed at the point of
junction, but further on the specular is entirely
pure and of the finest quality. Some very
finely crystallized garnets have been found in
this mine. Dynamite is the explosive in use.

The shipments since the opening in 1868 have
amounted to 288,484 gross tons, of which 53,617
tons were shipped during the present season,
up to Oct. 4. The two varieties of ore are sent
to market in admixture.

Upon an eastward continuation of the Cham-
pion seam, at Champion station, a new mine,
called the Keystone, is being opened up, where
the prospects are quite promising.

We now travel 7 miles further to the west-
ward, through an exceedingly picturesque re-
gion, along the banks of Lake Michigamme, to
the village of that name at its western extre-
mity, destroyed by fire last June, but since en-
tirely rebuilt. The mines of the Michigamme
Co., here situated, are upon the opposite side
of a synclinal basin from the Champion, the
extremity of which is some distance to the
westward. The seam is here entirely magnetic,
having an extreme width of 50 ft., with the
same central division as at the Champion. It
outcrops at a short distance from, and a slight
elevation above, the railroad, lying in a general
east and west direction, and dipping to the
south at a high inclination, having been traced
for nearly half a mile to the westward. Cuts
have been made to it from the railroad at seven
or eight different points, and the underground
system of mining will eventually be adopted.
The greater part of the ore is of extremely fine
grained, or steel structure, though some soft
ore is obtained. Very little pyrites has been
encountered as yet, but some of the hornblende
(silicate of iron and lime or magnesia) minerals
occur in combination.

An analysis of a sample of the ore by Britton,
gave:

Metallic iron	67.32
Oxygen	25.70
Water	3.57
Silica	3.90
Alumina	2.92
Lime	1.12
Phosphoric acid	.05
Protoxide of Manganese	1.01
	99.95

The mine was opened about a year ago, and
the shipments for the present season up to Oct.
4 were 36,497 tons.

The Spun Mountain Mine is situated upon a
continuation of the seam, about one and one-
half miles to the westward. The ore here, as
thus far developed, is soft and granular, and of
a bluish or black color. The hanging wall of
the deposit is quartzite, separated from the ore
by about two feet of chlorite schist. The foot
wall is diorite. In many places one-half of the
width of the seam on the foot wall side is com-
posed of a mixture of ore and quartz. Consid-
erable pyrites is found, but is mostly segre-
gated. A large quantity of the ore is mixed
with white fibrous hornblende, causing it to
rank as second grade. The deposit is, how-
ever, undoubtedly a very large and valuable
one. There are 4 or 5 openings now in opera-
tion, work having been commenced about a
year ago. The underground system will be
used eventually. An analysis of the ore by Dr.
Chandler gave:

Metallic iron	64.90
Oxygen	24.61
Oxide of manganese	Trace
Alumina	2.97
Lime	1.05
Magnesia	.19
Silica	6.28
Phosphoric acid	Trace
Sulphur	.25
	99.37

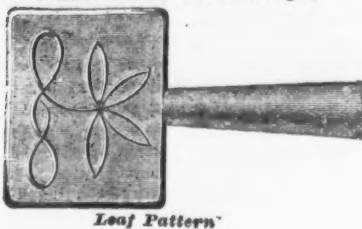
The shipments for the season up to Oct. 4 were
31,470 tons.

To the westward of this, in the neighbor-
hood of L'Ause, several discoveries have been
made recently, and new companies organized,
but this completes the list of the mines at pre-
sent worked in the Marquette district, a district
which contains the largest deposits of rich ores
in the known world, and in remarkable variety.
Their general characteristic is the presence of
silica, a moderate quantity of which serves
simply to bind ferruginous particles firmly to-
gether, but which, when in excess, entirely
ruins their quality, rendering them unfit for
smelting. A large number are pure enough for
Bessemer purposes, and some, like the Republic,
would serve admirably for use in the direct
process, such as those of Blair and Siemens.
It is very important that all should be analysed
and classified, and this has been done to a
great extent under the direction of Maj. T. B.
Brooks, the Assistant State Geologist, whose
forthcoming report a more detailed description
of the region may be obtained.

ODDEN HAIGHT,

H. D. SMITH & CO., PLANTSVILLE, CONN.

Patent Embossed Steps.



Leaf Pattern.

King Bolt Yokes.

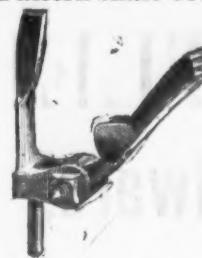


Established 1850.

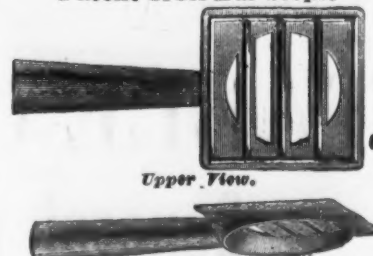
No. 6 Fifth Wheels.



1871 Pattern Shaft Couplings.



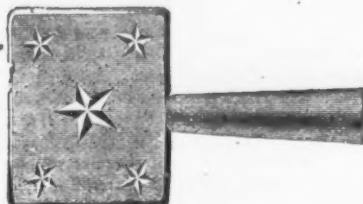
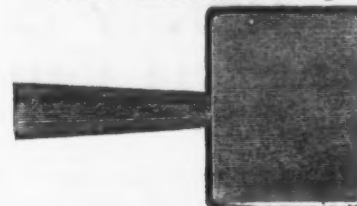
Patent Cross Bar Steps.



Upper View.

Lower View.

Solid Plain Pattern Steps.



Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.



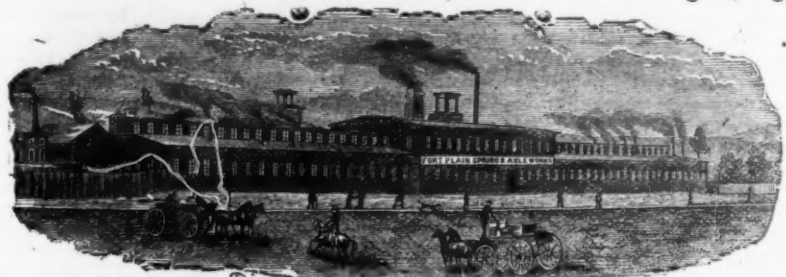
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COLLAR to the FINEST OF STEEL.Our facilities for manufacturing are very extensive, and with our recent additions of new and improved
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CARRIAGE BOLTS.

Buy the Best.

Clark's Patent
Carriage Bolt.Best Bolt manufactured for all kinds of agricultural machinery. Will not split the wood, and can not
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EXCELSIOR MFG. CO., Carriage Rims, Hubs and Spokes, Wood Hay Rakes,
VERMONT MFG. CO., Hay, Manure and Shovel Handles. All kinds of Ash, and
Hickory Timber Sawed and Turned to order.

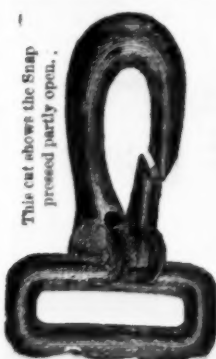
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This cut shows the Snap
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HENSHAW'S PATENT HARNESS SNAPS

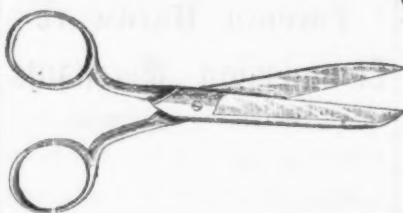
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MANUFACTURERS OF THE CELEBRATED:

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Star Brand.

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Patent Hose Shield,

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Cor. 3rd & Diamond Sts.

HAASE'S
Patents.

The Centennial Pavilions.

After careful and mature study of the numerous elaborate plans for the Centennial Buildings, the Committee on Plans and Architecture, of the United States Commission, have made their final awards, and have adopted the principal parts of the plan for the main exhibition building. Some of the particulars of the plan selected were mentioned in the *Ledger* yesterday. In coming to their final conclusions the committee were influenced by a number of prudent and wise considerations. The time left between now and 1876 required them to adopt for the main building such a structure as it is practicable to construct in two years, and this, together with the great costliness of some of the more ornate and ambitious structures, beautiful as they are, made the selection of the latter inexpedient and inadvisable. It was, moreover, desirable that the plan should be a flexible one, that is, that it should be capable of expansion according to future developments as the work goes on, and that it should be such that when the buildings are to be removed the materials in them can be utilized or disposed of to the best advantage of the stockholders. These qualities they found embodied in the best advantage in the model of the "pavilion plan," submitted by Calvert Vaux and George Kent Rayford, of New York; and the same model had several other recommendations, not the least of which is a facility for classification according to the most approved methods of all the articles exhibited, both according to their natural groupings and their geographical or national origin.

This "pavilion plan" may possibly fall short of expectation, so far as its external effect is concerned; there will be no grand striking features or impressive masses, but for interior beauty and convenience and grandeur of inside effects it is most admirable. Without the aid of elaborate drawings it is difficult to describe the plan in words, yet we shall attempt it. In the first place it may be said that the main exhibition building, exclusive of certain enlargements in the center and at the ends, will cover an oblong plot of ground 2040 feet in length by 690 feet in breadth. This is about the distance from Sixth street to Eleventh street, and about the width of the block from Market street to Arch street. But in the center and at the two ends there may be extensions, making the width 932 feet by 2040 feet, and making the ground plan with the intervening spaces cover an area nearly equal to that from Walnut to Market, and from Sixth to Eleventh street, or say five "squares" long by two "squares" wide. This large area is to be covered with at least fifty-five pavilions, and possibly by sixty-five, grouped together so as to form one complete structure; all parts of the interior being visible from end to end, forming "vistas" or "architectural groves" of magnificent sweep and extent. Thus, it will be seen that the one vast interior is made up of a number of immense arched or vaulted aisles, each of these aisles being made up of a number of "pavilions."

To give a further idea of the "pavilion" that is the unit of this plan, we shall try to describe a single one of the fifty-five or sixty-five "pavilions," which are embraced in the whole structure. Each "pavilion" covers a space 136 feet square, and it is formed by throwing a great arch over each of the four sides of the square, and then two other great arches diagonally across from corner to corner, thus making a vaulted roof. The dimensions of these arches may be conceived by the reader, if he will imagine spans to be thrown across the intersection of Broad and Spring Garden streets, where those streets are respectively 118 and 130 feet wide. There would be six immense spans here, two of them stretching across Broad street parallel with Spring Garden, two across Spring Garden parallel with Broad, and two more extending diagonally from corner to corner across the intersection. If the reader will then imagine these spans to be each about one hundred feet in height, he will have a mental photograph of one of the fifty-five pavilions which make up the grand and vast interior of vaulted aisles and vistas already mentioned, covering an area equal to ten of our squares or blocks.

There is another fine feature about these grouped pavilions which is not only beautiful, but which can be turned to account for a large variety of useful, convenient and ornamental purposes. At the corners of each of the separate pavilions the feet of eight arches come down together in sweeping curves like the wide spreading branches of a great oak tree gathering into the massive trunk. They form at their feet eight sided spaces or court yards, that can be left open for light and ventilation, that can be encircled by galleries for resting places or for observation of the whole interior of the exhibition; that can be used for restaurants, offices, buffets, etc., or for ornamentation according to the taste of each State or nationality, or for all these purposes combined.

This description, we trust, will give our readers some notion of the central idea of the plan adopted, and some approach to a view of the immensity and beauty of the interior of the structure to be built up by the grouping and aggregation of the "pavilions." It must be borne in mind, however, that what we have been endeavoring to describe is only the main exhibition building. Beside this, there are the permanent Memorial Hall, to cover one and a half acres, for which the State and the city have made appropriations; the Machinery Hall, to cover ten acres; the Horticultural Hall and Conservatory, and the Agricultural buildings.

The Wages System.—In a thoughtful article in the *Nation* we find the following: If the panic operates in any degree as a disincentive of any body of poor men who find themselves now sent adrift at the opening of

winter, or find their wages seriously reduced, and have their eyes opened by it as to the real conditions of their security and prosperity, they will have purchased their experience very cheaply. The deplorable feature in the system of paying labor by wages is undoubtedly that it makes large bodies of persons, of all ages and sexes, dependent on the providence and sagacity and honesty of one or half a dozen. If a great manager or manufacturer or financier makes a mistake or commits malfeasance in office, a thousand, or it may be ten thousand, persons are thrown out of employment at a week's notice, they do not know why, and cannot find out, and, what is worse, this fate is constantly impending over them. No outward signs of prosperity offer them the slightest guarantee against it. Indeed, nearly all the great failures and resultant panics occur when the industrial world seems to be sailing on a flood-tide of successful production. Now, there is no question that this blind and helpless dependence on the conduct of others with whom one's relations are solely commercial, is one of the most weakening and corrupting agencies to which human character can be exposed. The more a man has his fate in his own hands, the more of a man he is, and the greater end and aim of "labor reform," and indeed the only end and aim worth much talk, is the commitment to the working-classes, as far as possible, of the management of their own affairs. Indeed, we hardly hesitate to say that it is only through co-operation—that is, the participation of every worker in the business conditions and responsibilities which surround and uphold his peculiar industry—that any real and permanent improvement in his condition is to be looked for. Saving is very well, and it is well to be prepared for inundations and plagues; but it is better still to understand what brings inundations and plagues about, or to share fully and freely in the work of preventing them, instead of sitting with folded hands and praying lips waiting for them. Of course it is easy to point out the difficulties in the way of co-operation. It is quite true that it is largely a question of character; that if we cannot have improvement of character without co-operation, it must also be said that we can not have co-operation without improvement of character. But it must be borne in mind that the sole ground we have for believing that there is anything in store for the human race is the assumption that the character of the great mass of mankind can be bettered. If this be not true, science as well as literature and art is an idle pursuit, and the future of our civilization not worth thinking about.

The National Tube Works.—The shops of the National Tube Works, in East Boston, are closed. The business there has been principally the manufacture of tubes for locomotive boilers, and the shutting down of the works in Paterson, N. J., which were supplied from the East Boston mill almost exclusively, and of various other locomotive works, has made this suspension necessary. There is no financial embarrassment at all. The company has another mill in McKeesport, Penn., more than twice the size of that in East Boston, covering five acres of ground, and having a manufacturing capacity of 50,000 tons of iron annually. There will still be work enough to keep this enormous establishment active, and to it the company has removed most of their best workmen with their families, where they will be given employment. There is no intention of taking the business from this vicinity permanently, but just as soon as the prospect will warrant it the East Boston mill will be started up. It will be kept in readiness, and work can be begun with a few hours' notice. The establishment covers about two acres of ground, has employed regularly 400 men, has a manufacturing capacity of 20,000 tons of iron per annum, and is first-class in all its equipments. This is the first time work has been suspended, by day or night, for five years.

Special Notices.

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John Levy hereby notifies all his customers, and the Hardware trade generally, not to deliver goods or pay any accounts to his sons Louis and David Levy, or any body in general.

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Second hand Steam Hammer in complete order, bed plate and anvil, weight of blow 50 cwt. State lowest price, with particulars.

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OFFICE OF

The American Iron & Steel Association,
522 Walnut Street,
Philadelphia, Nov. 8, 1873.

NOTICE OF ANNUAL MEETING.

At a meeting of the Executive Committee of this Association, held at the office, on Friday, the 7th inst., it was Ordered, that a meeting of the members of the Association be held at the office, No. 522 Walnut Street, Philadelphia, at 10 o'clock, a. m., on

THURSDAY, NOVEMBER 20th,

to consider the present critical condition of the iron trade, receive the reports of the Secretary and Treasurer, and take such action as may be necessary with regard to the future work of the Association. A general attendance of the members is most earnestly requested. Very respectfully,

SAMUEL J. REEVES,

ATTORNEY: Chairman of Executive Committee.

JAMES M. SWANK, Secretary.

H. T. HAZELL, Auctioneer.

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Be it ordained and enacted, by the Burgess and Council of the borough of Bristol, and it is hereby ordained and enacted by the authority of the same, That all manufactures which shall be erected within the borough of Bristol, during the period of ten years from and after the passage of this ordinance, shall for and during said period be exempted from the payment of borough tax.

Enacted into an ordinance at the Council Chamber, this fourteenth day of July, A. D. 1873.

CHARLES E. SCOTT, Burgess.
Attest: J. WESLEY WRIGHT, Clerk.
Bristol, Pa., July 21, 1873.

Translations and Condensations.

The undersigned, commercial Editor of *El Cronista* the Spanish Government paper in this city, and Foreign Editor and Translator of the *Daily Bulletin*, has made it a specialty for years past to translate industrial matter, with the strictest adherence to the technical wording, from and into English, German, Spanish and French, for manufacturers, patentees and others, and begs to be recommended to the iron masters and trade in that capacity.

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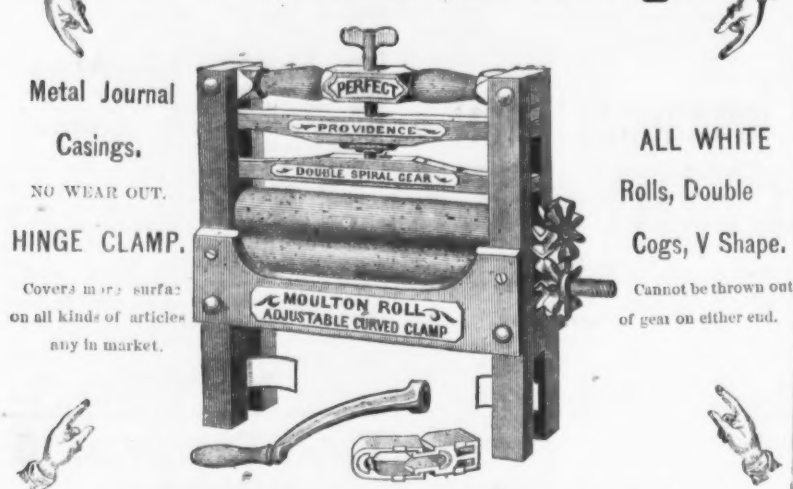
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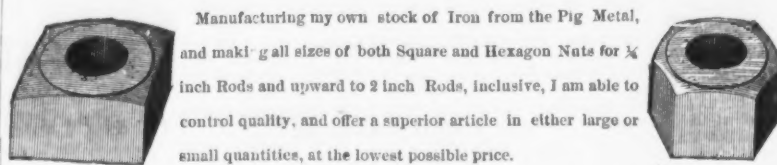
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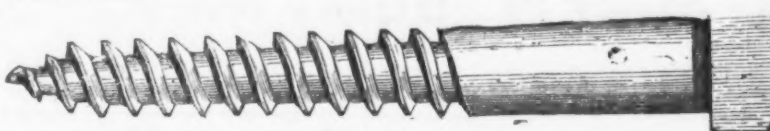
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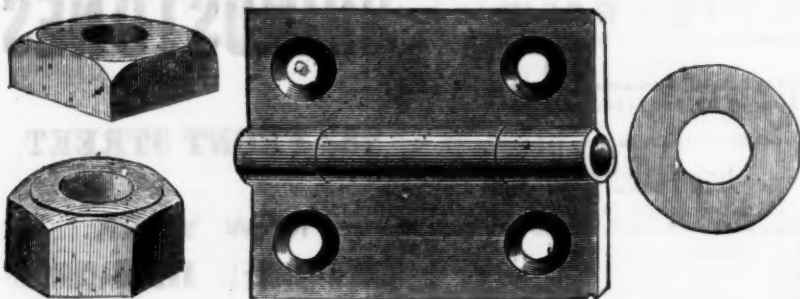
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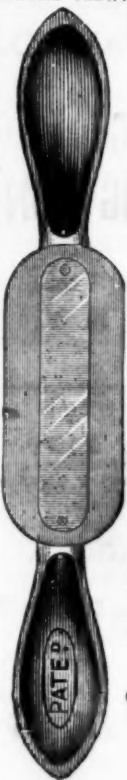
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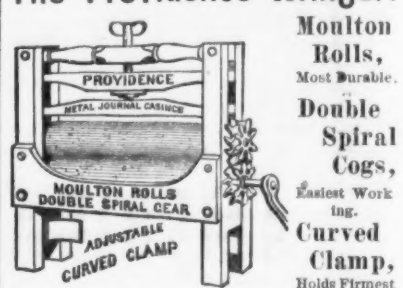
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CRANBERRY,
SUGAR LOAF

J. B. Markle & Co. JEDDO,
HIGHLAND

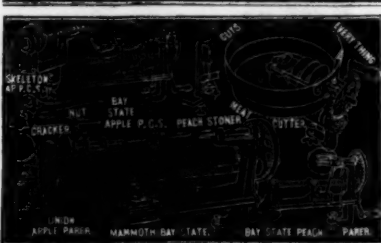
Pardee, Bro. & Co. LATTIMER

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D. H. WHITEMORE'S
Meat Cutter.

Cuts Everything for the Family.

Works extremely easy. The smallest size will cut one
pound of Sausage Meat per minute, two pounds of Pie
Meat per minute, and Hash for a family in one half
a minute. Price, \$30 per dozen. Hotel size (three times
the capacity). Price, \$72 per dozen. Have been sold for
one year. The highest premiums were awarded on each
of the two sizes at the New England Fair, in Boston, in
1873. Packed Half Dozen in Case.

MANUFACTURED AND SOLD BY

D. H. WHITEMORE, Worcester, Mass.

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CLARK, WILSON & CO., 61 Beekman St., N. Y.



CHAS. E. LITTLE,

59 Fulton Street, New York,

Maker and dealer in

Coopers' and Coachmakers',
Carpenters' and Slaters'
and Butchers

(Send for Catalogue.)

FOOT



FLAT AND ROUND HEAD MACHINE SCREWS,

OF SIZES, Nos. - - 4, 6, 8, 10, 12, 14, 16, 18, 20, 24, SCREW GAUGE.
 AND LENGTHS - - 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2 INCH.

PLUG AND BOTTOMING TAPS,

Manufactured, **KEPT IN STOCK**, and sold by

AMERICAN SCREW COMPANY, - - PROVIDENCE, R. I.

Fillister Head and Pattern Machine Screws Made to Order Promptly.

P. O. Box 3760.

UNION HARDWARE CO.,

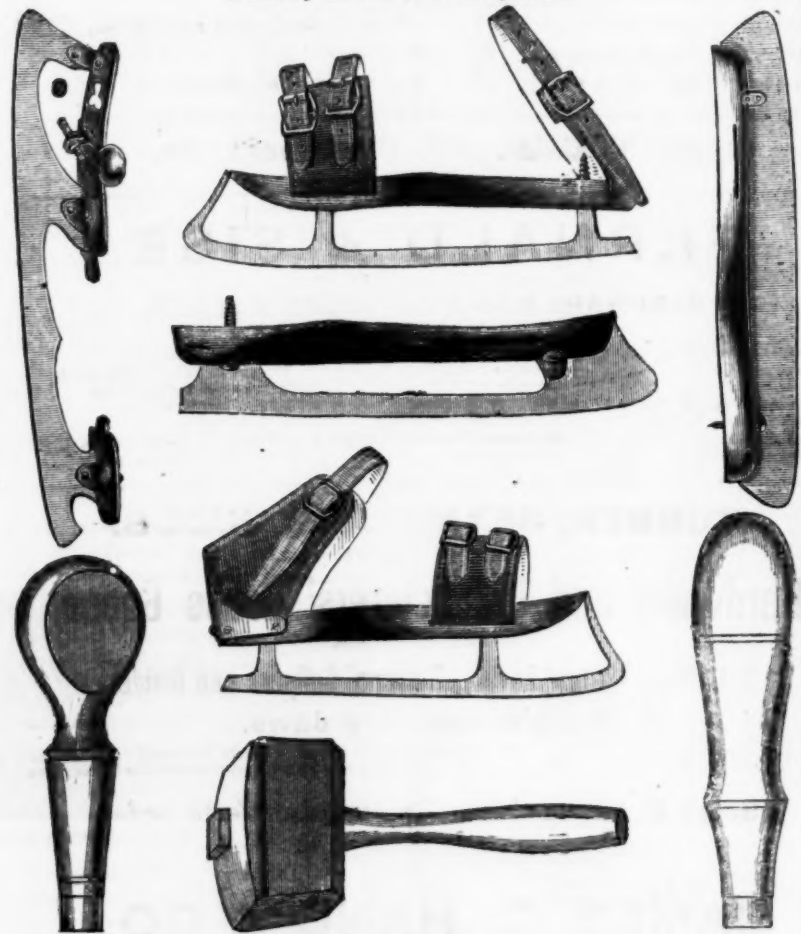
MANUFACTURERS OF

Skates, Skate Straps, Handles, Base Knobs,
Wood Turnings.

Also, Dog Collars, Muzzles, Parlor Skates, &c.

120 Chambers and 50 Warren Streets, NEW YORK.

Factory at Wolcottville, Conn.



Send for Catalogue.

Our Illustrated Catalogue is now ready for the fall trade of 1873, representing a full assortment of the largest and best stock of Skates in the market.

Also a full line and large stock of goods suited to the wants of the trade. Our extensive facilities for producing wood goods enables us to offer very low prices to manufacturers using large quantities of handles.

"Easily Applied and not Liable to get out of Order."—From Report of Judges at American Institute Fair, 1872.



The Challenge Door Spring Co.,



In Appearance the Most Beautiful. In Action the Most Graceful. In Use the Most Reliable.
The Challenge Springs are manufactured from Steel Wire, tempered by an Improved Process, the result of repeated experiments, and must not be classed by dealers with the numerous worthless "Coil Springs" made from common Bed Spring Wire.

No. 49 Ann Street, NEW YORK.

Gray's Door and Gate Spring.

No. 2.

**Simple,
Effective
AND
Easily Adjusted.**



MANUFACTURED BY
Van Wagoner & Williams,
27 Park Row, N. Y.

**DUCKHAM'S PATENT
Hydrostatic Weighing Machines
AND
DYNAMOMETERS,**

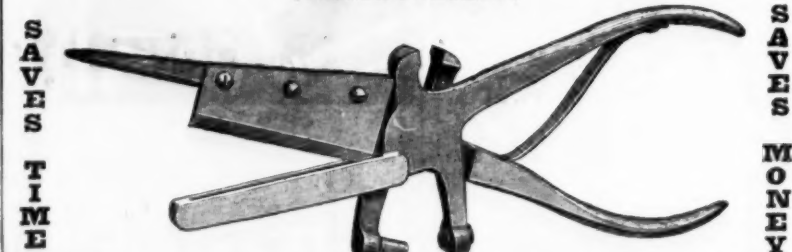
Capable of Weighing from 10 Cwt. to 100
Tons and Upwards.

Some purposes to which it can be applied.

(FIRST).—As a Weighing Machine generally.
(SECOND).—For ascertaining the correct weight of materials before, and continuously during manufacture at the furnace, cupola or forge.
(THIRD).—As a Dynamometer, to test the strength of Anchors and Cables; the strain on Ropes or Structures; the power of Machinery; the Traction Power on Land and Towage Power at Sea.

THOS. PROSSER & SON,
15 Gold Street, New York,
Sole Agents for Manufacturer in United States.

**AMERICAN BELT TOOL,
(FOSTER'S PATENT.)**



We would call your attention to this little Tool, which we consider an indispensable article in any well-arranged establishment using Belting. It is a combination of Punch, Cutter, Awl, and Nippers, combined in one Tool all that is necessary to put together Belting with lacing or hooks. Costing less than the same Tools bought separately.

SOLD AT MANUFACTURERS' PRICES BY
Minot & Co., Boston; Henry Hopkins, 96 Chambers St., New York;
J. L. Wayne & Son, Chicago.

LOWELL WRENCH CO., Worcester, Mass., Manufacturers.
CHARLES CHURCHILL & CO., European Agents, 61 Wilson St., Finsbury, London, E. C.

Greenfield Tool Co.,

Sole Manufacturers of the celebrated

"DIAMOND" PLANE IRONS,

Of uniform temper, and will hold a fine cutting edge; with solid steel caps, and fully warranted.

AND THE

Patent Machine Forged Ox Shoes,

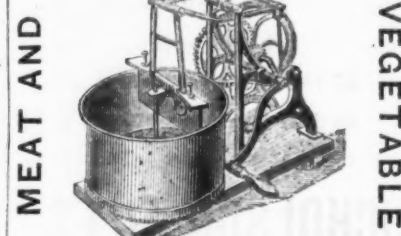
Better and cheaper than any hand made shoe, universally liked, and always used after one trial. Also

BENCH AND MOULDING PLANES of every description.

Address, for Illustrated catalogue and prices,

GREENFIELD TOOL CO., Greenfield, Mass.

Warehouse in New York, 37 Chambers Street.

AMERICAN**CHOPPER,**

Sold by all Hardware Dealers.

D. A. NEWTON & CO.,

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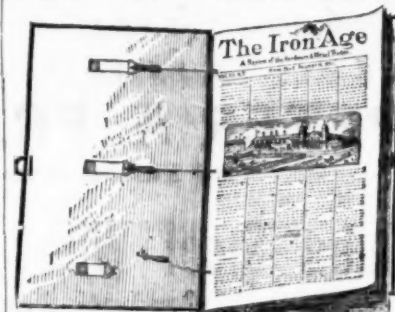
J. W. H. SMITH & CO.,
CHARLOTTE, MICH.

Manufacturers of

Extra Quality Hay Fork, Hoe & Rake Handles
& "D" Shovel, Spade, & Fork Handles
& Hard Wood Lumber.

Special attention given to orders for Export.

**Get Binders
FOR THE IRON AGE.**



We have made arrangements to furnish Koenig's PATENT BINDER, which we think altogether the best before the public, to our subscribers at the following very low rates—about the wholesale prices by the dozen.

Half Cloth.....\$1.00 each.
(Cloth Back and Corners, with Morocco Paper Sides—a good, serviceable Binder.)

Full Cloth.....1.50
(Morocco Cloth Back and Sides.)

Half Roan.....1.75
(Roan Back; Cloth Sides.)

Half Morocco.....2.00
(Morocco Back and Corners; Cloth Sides.)

The above are all in black, which is the most serviceable color, with the exception of the Half Morocco, which are put up in a number of handsome shades. The name of the paper is stamped in gold on either side, and each Binder is furnished with loops by which it can be hung up against the wall as newspaper files are usually disposed of.

The Binders will each hold the twenty-six numbers in the form of a bound volume. They can be nicely inserted in two or three minutes by any boy of ordinary intelligence; and when the covers are full they can be either preserved in that shape as bound volumes of *The Iron Age*, or they can be emptied and used again. There is no possibility of their getting out of order, unless the cords, which are very strong, wear out, when anyone can easily replace them with a piece of fishing line or other suitable string. Subscribers who value the paper should order them at once, so as to keep the paper in good order.

On receipt of the price we will ship them, safely put up, by any express line or to any New York house to be packed. They are too large to be sent by mail.

THE NICHOLSON FILE.

All *Nicholson Files* are cut with the Patent *Increment Cut*, an invention owned and controlled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly *expanding or increasing in size and space from the point*, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at least) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will *not* be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of *Increment Cut File*, which possesses all the advantages of hand cut work, and the accuracy and uniformity of machine work. It is now upwards of seven years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

We put all files under seven inches in boxes of either one-half or one dozen each. These boxes are neatly arranged, and open on the end, on which the kind is plainly marked with printed labels, acknowledged improvements on the old methods.

The "*Increment File*" is not an experiment, but an established fact, and already has acquired a legitimate demand for upwards of 500 dozen per day. We employ no *regular Travelers*, but our goods may now be found in the hands of the principal jobbers and dealers throughout the country.

Prices and terms will be forwarded on application to

NICHOLSON FILE COMPANY,
Providence, R. I.

CAUTION.

It has just come to our knowledge that certain parties in the West are engaged in buying up **WORN OUT FILES** of our manufacture, and, after immersing them in an acid bath, selling the same in packages which have a label of the same color and general appearance as ours, and falsely stating as follows:

NICHOLSON FILES,

Providence, R. I.

Increment Cut.

Made from Best English Steel. &c.

Our friends and the public are cautioned against this deception, which we consider one of a most injurious character, not only to ourselves, but to all dealers and consumers who desire the

"NICHOLSON" FILES

as we produce them, as files so



treated are comparatively valueless for use.

We have taken steps to have the parties thus engaged in deceiving the public, and trading upon our reputation, presented to the Courts for treatment, and will thank our friends having information bearing upon this subject to notify us, promptly, of any parties who have sold, or are offering for sale, "*Nicholson*" files doctored and labeled as above described.

Nicholson File Co.,

W. T. Nicholson, Agent.

Providence, R. I., Sept. 25th, 1873.

All packages of **NICHOLSON FILES** leaving our works bear a label on green paper like the one herewith attached.

1816. 1844. 1850. 1868.
H. F. F. H. F. F. & SON. P. A. F. P. A. F. & CO.

PETER A. FRASSE & CO.,

95 Fulton Street, New York,
IMPORTERS OF

Stubs' Steel Wire, Files and Tools,

Grobet Swiss Files,

Extra Quality English Spring Steel Wire,

Nos. 1 to 34.

Steel Wire for Sewing Machine Needles and for other Purposes,
French Cold Rolled Sheet Steel,

Sizes, 22 to 36 Gauge.

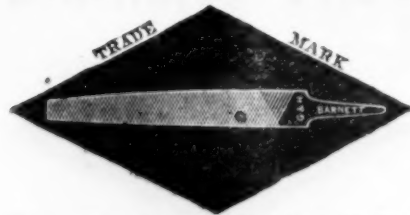
Jewelers', Engravers' & Mechanics' Tools.

The only Agents in the United States for

HUBERT'S CELEBRATED FRENCH EMERY PAPER.

For Hatters' and Machinists' Use.

Black Diamond File Works.



G. & H. BARNETT,

39 41 & 43 Richmond St. Phila.

LANE, GALE & CO

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FOR

TROY WRO'T BUTT CO'S Wrought Iron Butts (Riveted Pin).

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E. W. GILMORE'S STRAP and T HINGES.

SCOVIL MFG. CO'S BRASS BUTTS.

J. M. KING'S STOCKS & DIES.

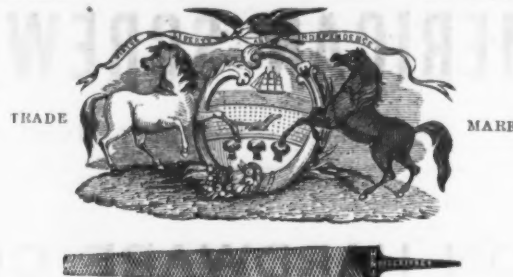
McCREA'S SHOE THREADS and TWINES.

G. F. ELLS' CURRY, CATTLE and PLANTATION CARDS,

ENAMELED and TIN WARE, &c., &c., &c.

TROY, N. Y.

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McCAFFREY & BROTHER,

Manufacturers of **FIRST QUALITY FILES** and **RASPS ONLY**,
Nos. 1732 & 1734 North Fourth Street, Philadelphia, Pa.

G. W. Bradley's Edge Tools.

Butchers' Cleavers,

Rush Hooks, all patterns,

Turpentine Tools, all kinds,

Coopers' Tools, a specialty,

Ship Carpenters' Tools,

Axes and Hatchets,

Grub, Garden & Planters' Hoes,

Mill Picks, Mattocks & Picks

Box Scrapers & Chisels,

Cotton Hooks & Samplers.

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Reading Hardware Co.

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Hain Seeder, Patent Twine Boxes, Picture Nails and Hooks, Escutcheon Pins, Coat and Hat Hooks; also
Miscellaneous Iron and Brass Goods.

Small Brass and Iron Castings made to order.
64 Duane Street, NEW YORK.

JAMES C. HAND & CO.

COMMISSION MERCHANTS,

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AGENTS FOR:

William Penn, Reading and Norristown Pig Iron.

Reading Iron Co.'s (Crescent Brand) Nails, Boiler Flues, &c.

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Wm. Jessop & Sons' Steel and Norway Nail Rods.

Barrows, Savery & Co.'s Hollow Ware Castings, &c.

Fisher & Norris' "Eagle" Anvils and Vises.

Washington Mills Emery.

Heavy Hardware, &c., &c.

W. F. SHATTUCK & CO.,

113 Chambers and 95 Reade Street, New York.

MANUFACTURERS OF AMERICAN HARDWARE.

Cox & Tuff's Pat. Wrenches. Mouse Traps. Wire Selves.

Axe, Pick, Sledge & Hammer. Scute Beams.

Handles. Patent Tap Borers.

Hatchet, Auger, Chisel & File. Tool Chests.

Mallets. Pat. Boot Jacks. Gimlets and Gimlet Bits.

Augers and Auger Bits. Cocoon Nut Dippers.

Yaw's Cow Bells.

Axes, Picks and Hatchets.

Hammer, Crow Bars.

Sad Irons.

Boiling Machines.

Cast Iron Hatchets.

Coffee Mills.

Star Steel Spoons.

Stocks and Dies.



OHIO TOOL CO.,
Manufacture

Planes, Moulding, Plane Irons, Bench Screws, Hand Screws, Hand Saws, Plane and Saw, Framing Chisels, Drawing Knives, Coopers' Edge Tools, Truss Hoops.

Clark, Wilson & Co., Agents, 81 Beekman St., N. Y.

F. G. HOLTON & CO.,

MANUFACTURERS' AGENTS

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Hardware Specialties,

124 Walnut St., Cincinnati, O.

Branch Warehouse for W. & B. Douglas' Pumps and

Yale Lock Manufacturing Co.

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Star Tool Co., Schuetzler Mfg. Co.

Mahby, Curtis & Co., Lakin Mfg. Co.

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Phillips Mfg. Co., Housh Mfg. Co.

Eastern prices guaranteed. Orders solicited.

GEO. W. BRUCE,

No. 1 Platt Street,

Continues to Import

Nettlefold & Chamberlain's,

IRON AND BRASS SCREWS, AND WIRE

GOODS, RIVETS, &c.,

and assures the trade that his stock, assortment and

prices are not equaled by any other parties, whatever

their pretensions.

NEW YORK, April 1st, 1873.

LANE & BODLEY,

John and Water Streets, Cincinnati, O.

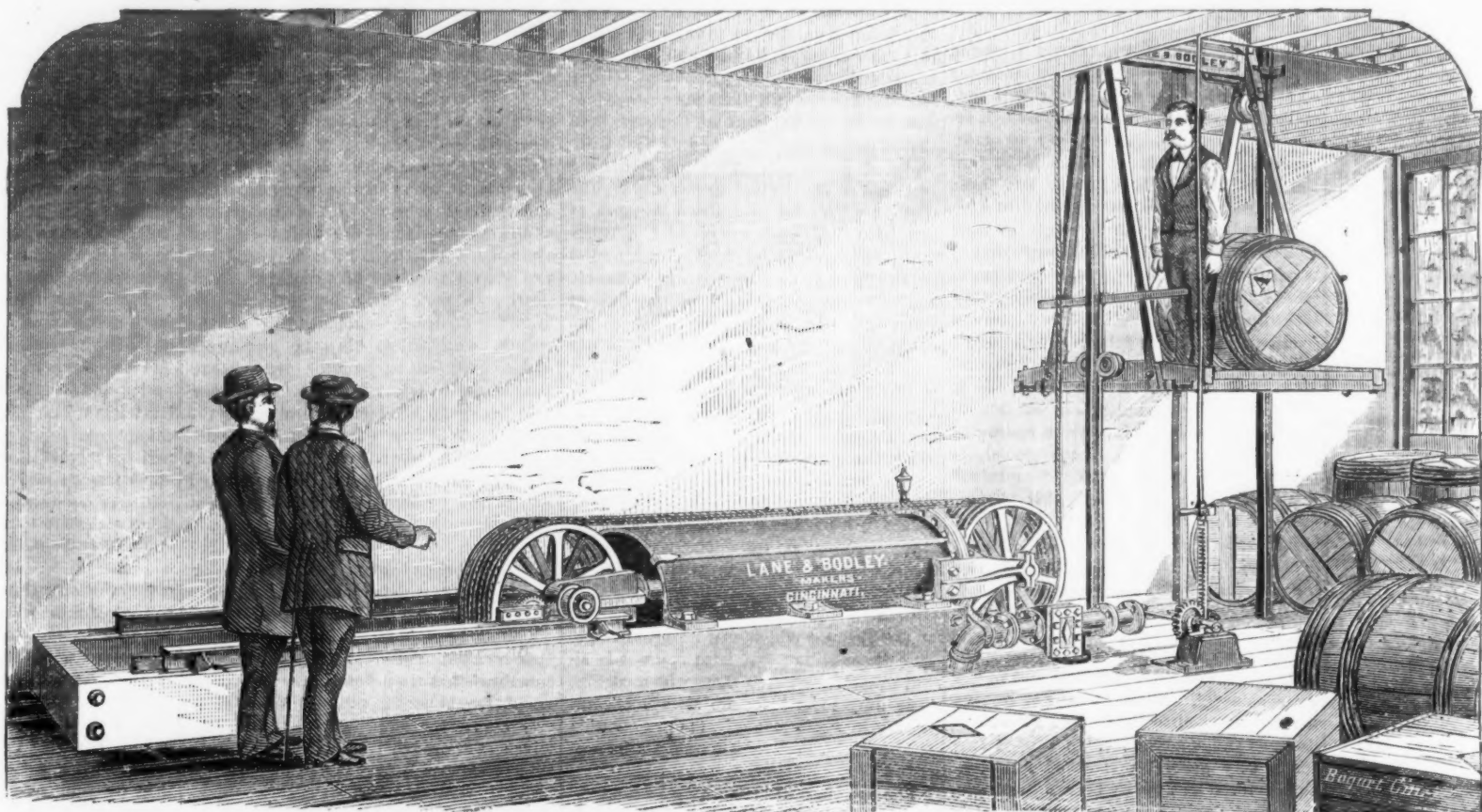
MANUFACTURERS OF

HYDRAULIC ELEVATORS AND CRANES

FOR

WAREHOUSES, STORES, HOTELS, RAILROAD DEPOTS, &c.

CIRCULARS SENT ON APPLICATION.



LANE & BODLEY'S COMPOUND HYDRAULIC ELEVATOR.

POWER ELEVATORS have become a necessity in all mercantile and manufacturing establishments where a large amount of goods, products, etc., are to be moved from floor to floor, with greatest economy of time and labor. The high price of real estate requires that buildings should be many stories in height, in order to obtain the requisite floor surface at the least expense, while the high price of labor requires the most economical means, to make the elevated surface available. In erecting elevators, such items as cost of construction, efficiency and safety are most to be considered.

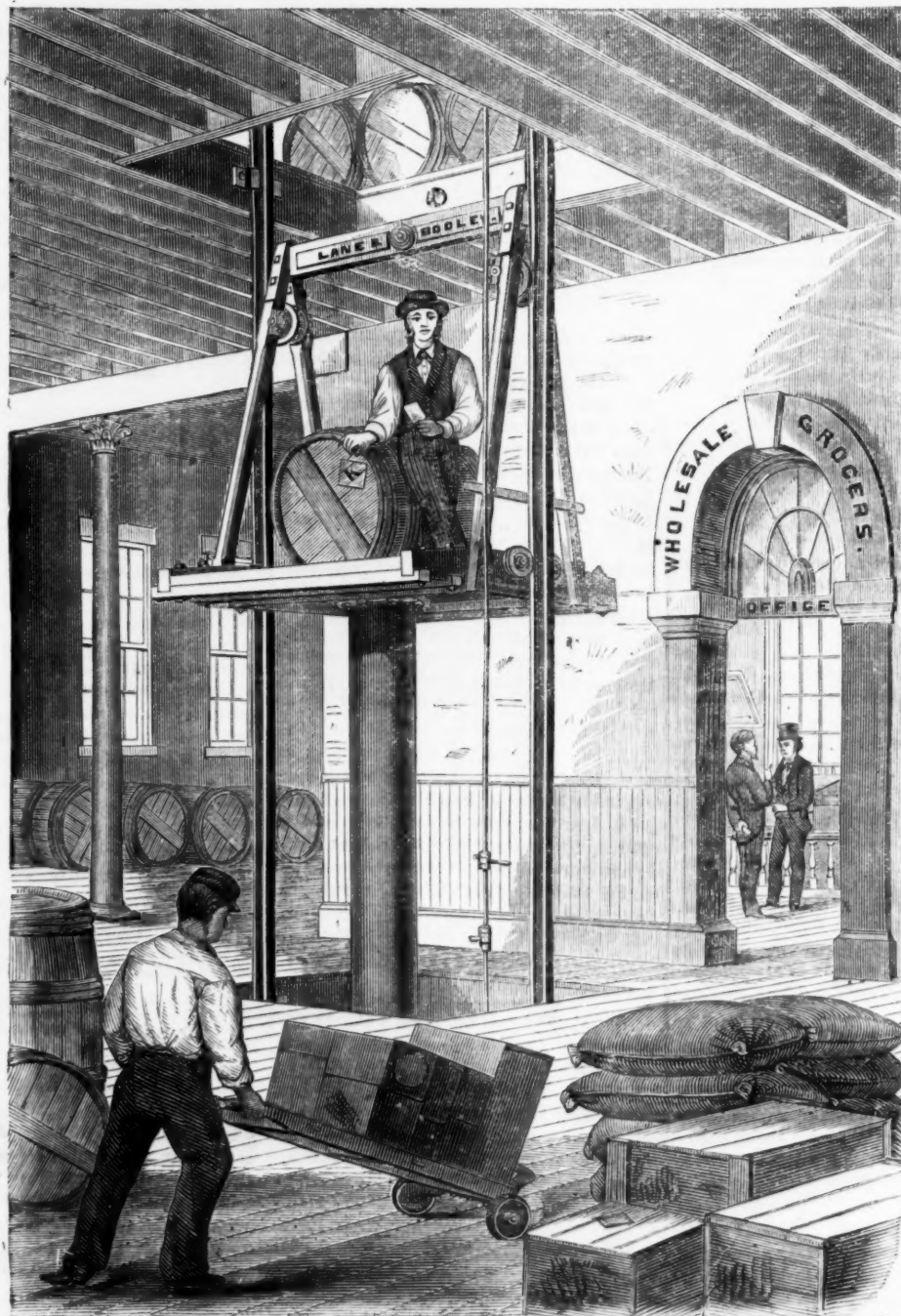
Safety is one of the most important items to be considered, as the repeatedly fatal accidents that are constantly occurring from falling platforms, remind us. A due regard to the protection of life and property demands a full and critical examination into the construction of Power Elevators, and the user of this class of machines should require the best known means of protection. From our many years' experience in erecting Elevators, we can assure our customers that we fully appreciate all the dangers attending their use, and that in the construction of our machines this especial requisite has been considered.

We are fully prepared to erect Hydraulic Elevators at any point where a sufficient pressure of water can be had, or we will take contracts to furnish a series of Elevators with water of sufficient pressure by pumping into a receiver, from that distributing it to the Elevator and returning it to the pump without waste. In locations where a scarcity of water exists this plan is desirable.

Hydraulic Elevators have many advantages for warehouses, stores, hotels, etc., where no other motive power is required. They save largely in insurance, first cost, and engineer's wages, and they are always ready for use. We erected the first Hydraulic Elevator in this city in 1870. We have erected 50 since that time that are highly satisfactory.

We make two forms. One known as the direct action, the other a compound machine, or a water in place of a steam engine.

The direct action is preferred in all moderate lifts where the cylinder can be sunk in the ground to the depth required. This cylinder must go down as deep in the earth as the platform is to be elevated above it. It is a strong cast iron pipe, made water tight. At the top is a stuffing box and branch to receive the water from the mains in the street. In this is inserted a piston of the diameter to give the power required. On the top of this piston the platform is placed and kept in position by guides.



LANE & BODLEY'S DIRECT HYDRAULIC ELEVATOR.

A valve of peculiar construction is attached, to control the inlet and outlet, and is worked by the rod on the side of the hatch.

To elevate the platform the valve is opened, and the water flows into the cylinder, producing a lifting power equal to the area of the piston and the pressure per square inch.

To lower the platform the outlet valve is opened, and gravity carries the piston and platform down by displacing the water and forcing it into the sewer. The movements are without shock or vibration. No feeling of motion is felt by a person on the platform except from passing surrounding objects.

Our compound or Hydraulic Engine is known as the Armstrong plan, and is largely used in England for hoisting purposes. Its simplicity and efficiency renders it the most desirable form for the purpose.

From actual tests we find it develops a larger percentage of power than it is possible to attain in any other mechanical arrangement for a like purpose. It is entirely automatic in its action, and requires no attention except occasional lubrication.

The cylinder is made of the size required for the elevation and the load to be raised; one end of it is open, the other closed.

The piston is fitted to the bore of the cylinder, and with the rod is attached at opposite end to a cross head. On this cross head is placed a series of sheaves. At the opposite end of the cylinder, supported by brackets, is a duplicate series of sheaves; the whole arrangement of sheaves and ropes is an application of the ordinary block and tackle combination.

The wire rope is passed over the sheaves, one end attached to the platform, the other to the cylinder.

The piston moving out by the flow of water from the main pipe through the valve, into the cylinder, elevates the platform.

The water is withdrawn to lower the platform, its weight reversing the motion of the piston.

The downward movement is arrested by stopping the discharge of water, and all the movements are controlled by a rod and stops.

Our Patent Gravity Safety Catch is applied to all our compound machines.

We have invented an ingenious device to measure and register the amount of water used with perfect accuracy, and can make the attachment to any hydraulic engine and guarantee the correctness of the instrument.

THE NICHOLSON FILE.

All Nicholson Files are cut with the Patent Increment Cut, an invention owned and controlled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly expanding or increasing in size and space from the point, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at least) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will not be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of Increment Cut File, which possesses all the advantages of hand cut work, and the accuracy and uniformity of machine work. It is now upwards of seven years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

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as we produce them, as files so



treated are comparatively valueless for use.

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W. T. Nicholson, Agent.

Providence, R. I., Sept. 25th, 1873.

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1816. 1844. 1850. 1868.
H. F. F. H. F. F. & SON. P. A. F. P. A. F. & CO

PETER A. FRASSE & CO.,

95 Fulton Street, New York,

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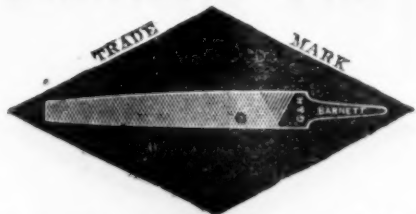
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For Hatters' and Machinists' Use.

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39 41 & 43 Richmond St. Phila.

LANE, GALE & CO

SOLE AGENTS

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THE EAGLE SQUARE CO'S Steel and Iron Squares.

E. F. HURD'S AXES, HATCHETS, ADZES, &c., &c.

G. T. LANE'S PLANTERS' HOES.

AGENTS FOR

BURDEN'S HORSE and MULE SHOES.

E. W. GILMORE'S STRAP and T HINGES.

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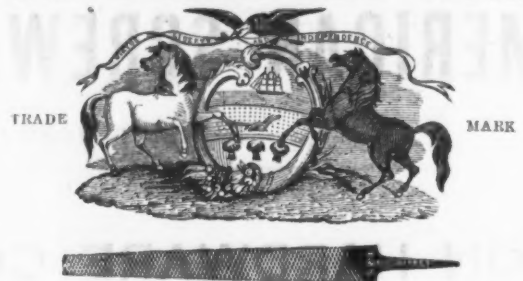
MCCREA'S SHOE THREADS and TWINES.

G. F. ELLS' CURRY, CATTLE and PLANTATION CARDS.

ENAMELED and TIN WARE, &c., &c., &c.

TROY, N. Y.

PENNSYLVANIA FILE WORKS.



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Manufacturers of FIRST QUALITY FILES and RASPS ONLY,
Nos. 1732 & 1734 North Fourth Street, Philadelphia, Pa.

G. W. Bradley's Edge Tools.

Butchers' Cleavers,

Rush Hooks, all patterns,

Furpentine Tools, all kinds,

Coopers' Tools, a specialty,

Ship Carpenters' Tools,

Axes and Hatchets,

Grub, Garden & Planters' Hoes,

Mill Picks, Mattocks & Picks

Box Scrapers & Chisels,

Cotton Hooks & Samplers.

N. WEED. 37 Chambers St.

FERNALD & SISE,

100 Chambers Street, NEW YORK,

HARDWARE MANUFACTURERS' AGENTS,

Reading Hardware Co.
Crooke & Co.
Verkes & Plumb.
Hartje, Wiley & Co.
Vulcan Horse Nail Co.
Walsh & Bro.
Moran & Sons.

Barnes & Deitz.
Nashua Lock Co.
Arcade File Works.
William McNeice.
Langstroth & Crane.
Keystone Manufacturing Co.
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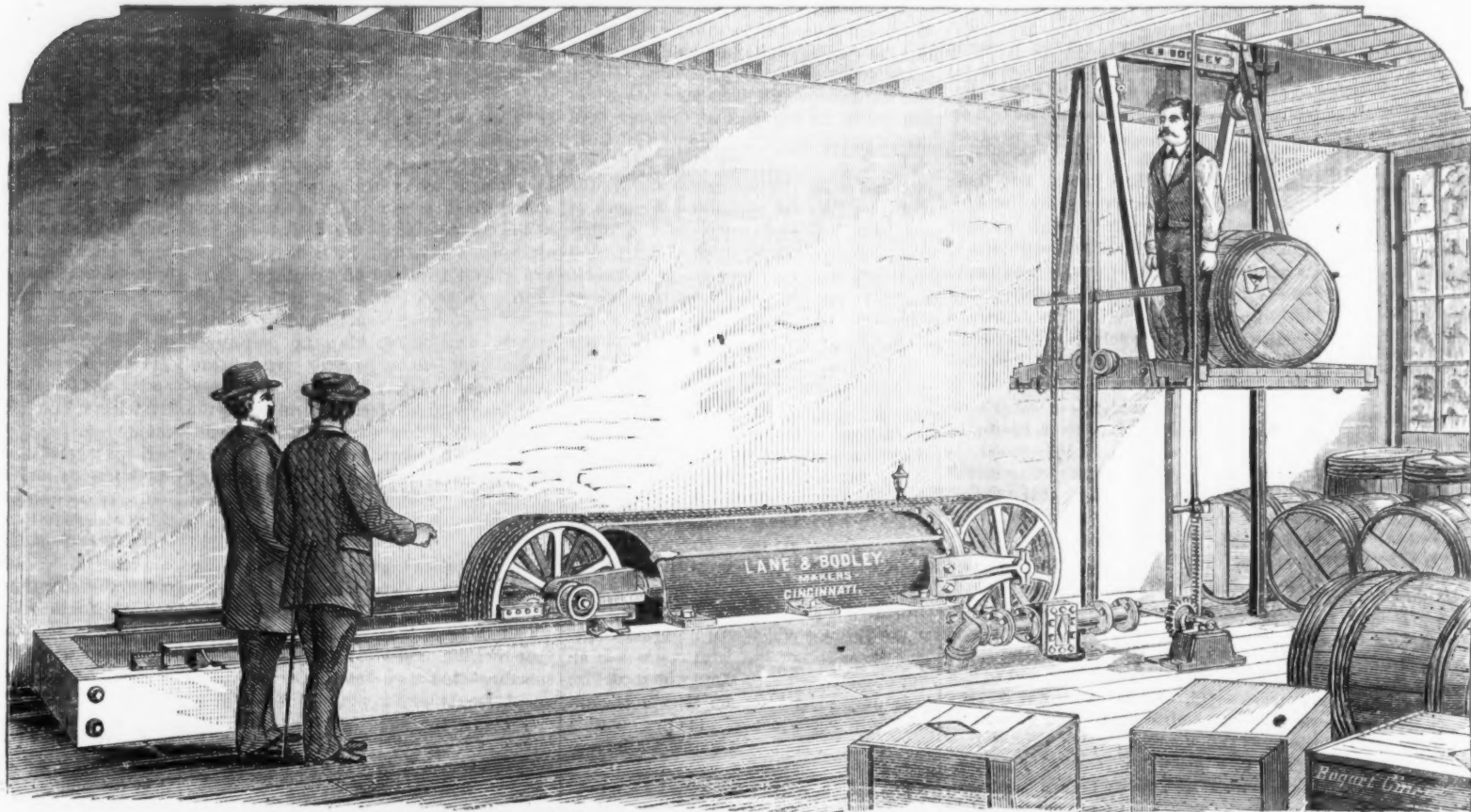
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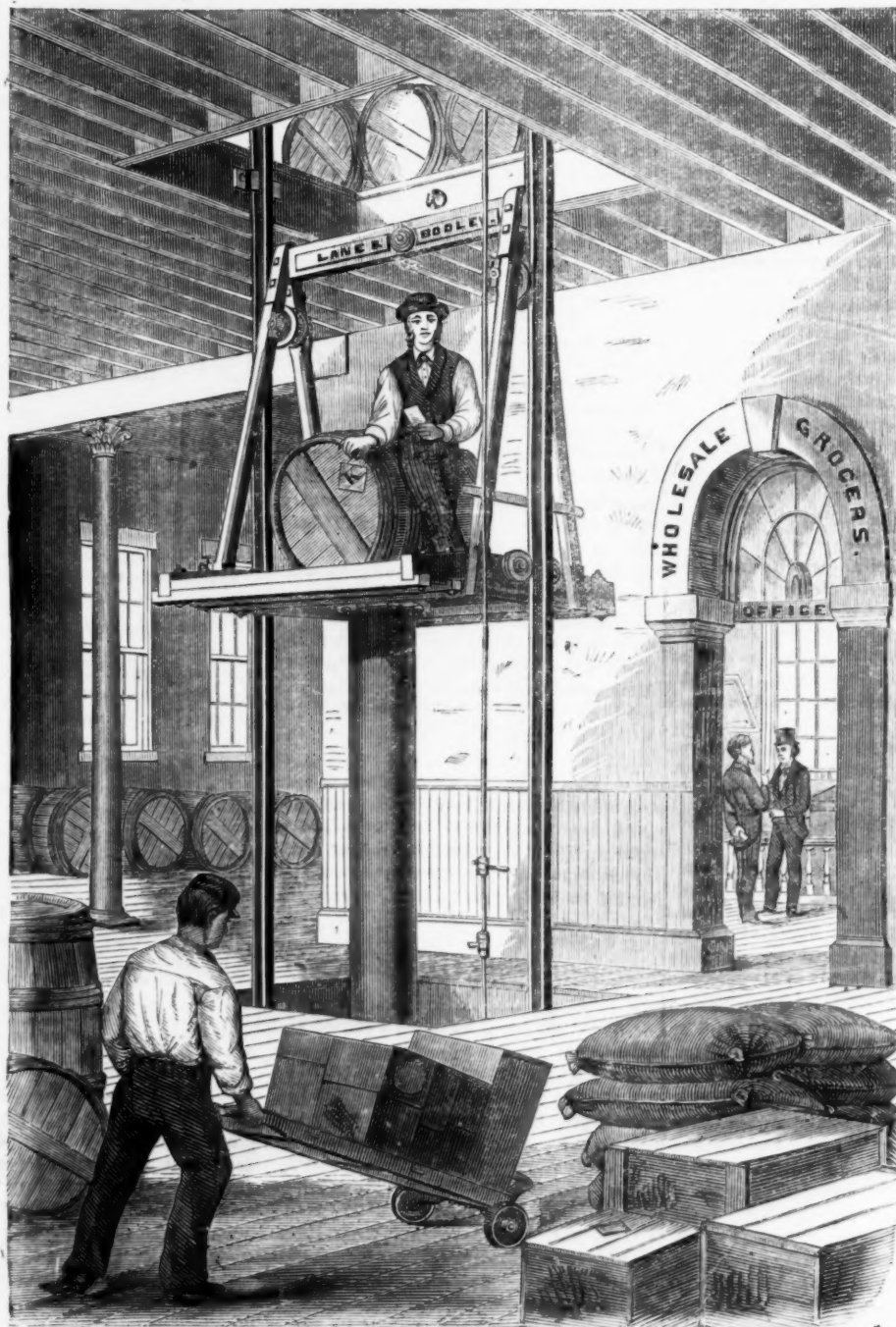
Safety is one of the most important items to be considered, as the repeatedly fatal accidents that are constantly occurring from falling platforms, remind us. A due regard to the protection of life and property demands a full and critical examination into the construction of Power Elevators, and the user of this class of machines should require the best known means of protection. From our many years' experience in erecting Elevators, we can assure our customers that we fully appreciate all the dangers attending their use, and that in the construction of our machines this especial requisite has been considered.

We are fully prepared to erect Hydraulic Elevators at any point where a sufficient pressure of water can be had, or we will take contracts to furnish a series of Elevators with water of sufficient pressure by pumping into a receiver, from that distributing it to the Elevator and returning it to the pump without waste. In locations where a scarcity of water exists this plan is desirable.

Hydraulic Elevators have many advantages for warehouses, stores, hotels, etc., where no other motive power is required. They save largely in insurance, first cost, and engineer's wages, and they are always ready for use. We erected the first Hydraulic Elevator in this city in 1870. We have erected 50 since that time that are highly satisfactory.

We make two forms. One known as the direct action, the other a compound machine, or a water in place of a steam engine.

The direct action is preferred in all moderate lifts where the cylinder can be sunk in the ground to the depth required. This cylinder must go down as deep in the earth as the platform is to be elevated above it. It is a strong cast iron pipe, made water tight. At the top is a stuffing box and branch to receive the water from the mains in the street. In this is inserted a piston of the diameter to give the power required. On the top of this piston the platform is placed and kept in position by guides.



LANE & BODLEY'S DIRECT HYDRAULIC ELEVATOR.

A valve of peculiar construction is attached, to control the inlet and outlet, and is worked by the rod on the side of the hatch.

To elevate the platform the valve is opened, and the water flows into the cylinder, producing a lifting power equal to the area of the piston and the pressure per square inch.

To lower the platform the outlet valve is opened, and gravity carries the piston and platform down by displacing the water and forcing it into the sewer. The movements are without shock or vibration. No feeling of motion is felt by a person on the platform except from passing surrounding objects.

Our compound or Hydraulic Engine is known as the Armstrong plan, and is largely used in England for hoisting purposes. Its simplicity and efficiency renders it the most desirable form for the purpose.

From actual tests we find it develops a larger percentage of power than it is possible to attain in any other mechanical arrangement for a like purpose. It is entirely automatic in its action, and requires no attention except occasional lubrication.

The cylinder is made of the size required for the elevation and the load to be raised; one end of it is open, the other closed.

The piston is fitted to the bore of the cylinder, and with the rod is attached at opposite end to a cross head. On this cross head is placed a series of sheaves. At the opposite end of the cylinder, supported by brackets, is a duplicate series of sheaves; the whole arrangement of sheaves and ropes is an application of the ordinary block and tackle combination.

The wire rope is passed over the sheaves, one end attached to the platform, the other to the cylinder.

The piston moving out by the flow of water from the main pipe through the valve, into the cylinder, elevates the platform.

The water is withdrawn to lower the platform, its weight reversing the motion of the piston.

The downward movement is arrested by stopping the discharge of water, and all the movements are controlled by a rod and stops.

Our Patent Gravity Safety Catch is applied to all our compound machines.

We have invented an ingenious device to measure and register the amount of water used with perfect accuracy, and can make the attachment to any hydraulic engine and guarantee the correctness of the instrument.

The Iron Age.

New York, Thursday, November 13, 1873.

DAVID WILLIAMS, . . . Publisher and Proprietor.
JAMES C. BAYLES, . . . Editor.
JOHN S. KING, . . . Business Manager.

The Iron Age is published every Thursday morning, at No. 19 Warren Street, New York, on the following terms:

SUBSCRIPTION.
Weekly Edition \$4 a year.
Issued every THURSDAY Morning. Contains full Trade Reports for the week, brought up to the close of business on the previous day.

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City Subscribers will confer a favor upon the Publisher, by reporting at this office any delinquency on the part of carriers in delivering *The Iron Age*; also, the loss of any papers for which the carriers are responsible. Our carriers are instructed to deliver papers only to persons authorized to receive them, and not to throw them in hall ways or upon stairs; and it is our desire and intention to enforce this rule in every instance.

CONTENTS.

First Page.—The Steel Bridge at St. Louis. New Geological Revelations.
Third Page.—Automatic Safety Hatches. Ohio River Improvements.
Fifth Page.—New Patents.
Seventh Page.—Iron Works in the North of England.
Ninth Page.—Business Items.
Eleventh Page.—The Lake Superior Iron Region.
Thirteenth Page.—The Outlook. The Iron and Steel Association and the Questions of the Day. Government Boiler Tests. Banking Reform. Scientific and Technical Notes.
Fifteenth Page.—Trade Report.
Seventeenth Page.—Trade Report (concluded). Philadelphia Correspondence.
Nineteenth Page.—The Manufacture of Spiegel Eisen.
Twenty-first Page.—New York Wholesale Prices of Hardware and Metals.
Twenty-third Page.—New York Wholesale Prices (concluded).
Twenty-fifth Page.—The Iron Age Directory.
Twenty-seventh Page.—Philadelphia, Buffalo, Pittsburgh, Detroit, Cincinnati and London Hardware and Metal Prices.
Twenty-ninth Page.—Chicago, Boston, and St. Louis, Hardware and Metal Prices.

The Situation and the Outlook.

Although the effects of the late financial panic have been so much more serious than at first seemed probable, that it is scarcely safe to venture predictions of the future even from week to week, we fail to discover anything in the situation to shake our faith in the ability of the country to recover quickly and without permanent ill effects from the depression which now exists. The general suspension of manufacturing which has taken place is undoubtedly necessary, but the manufacturers have, as the rule, retired in good order before the panic, and are in a position to take immediate advantage of the first signs of improvement. That they will soon be required to resume operations again to supply the markets with commodities, seems to be the opinion of those best able to forecast the future of trade. When the panic burst on the country, like a thunder storm from an almost cloudless sky, manufacturers in most trades reported that they were unable to keep up with their orders, and for supplies of many kinds of staple goods, the market was dependent upon current production. The suspension of manufacturing operations was not caused, therefore, by over production; there are no complaints of bad debts among manufacturers or merchants, and there is nothing in the business situation to account for the present unparalleled stagnation of trade. All sections have been blessed with abun-

dant crops, the foreign demand for our surplus food product is more imperative than it has been for many years, our cotton and petroleum are needed abroad in undiminished quantities, our imports are falling off in a more than proportionate ratio to the increase in our exports, and the trade balance is now in our favor for the first time in several years. All this is favorable to quick recovery—indeed, more than favorable. During the winter the consumption of manufactured goods will continue, though doubtless on a less liberal scale than under ordinary conditions, and if the expectations of an active spring trade are realized, we shall need to resume manufacturing with more than ordinary activity within a few weeks, to replenish the stocks which, by that time, will have been much reduced.

After a careful survey of the whole field, we fail to discover any substantial basis for a protracted financial stringency and industrial stagnation, nor do we believe the present condition can last much longer. Our chief surprise is that it has lasted as long as it has. In many directions we already see signs of recovery. Merchants report that collections are becoming easier, though orders have not yet begun to come in again, and the general opinion seems to be that the great danger has passed for those houses which have so far managed to keep their heads above water. It is only the same lack of confidence which has contributed so much to the general depression, and maintained the stringency by keeping money locked up which should have been returned to circulation, that is delaying the recovery which now promises to be speedy and complete. In times like these, everyone is more or less timid, but when the general apprehension gives place to a feeling of relief that the danger, if not passed, is passing, and to a hope of renewed prosperity, the currency still hoarded will find its way back into circulation, and business men will pay their debts as they come due, without feeling especially anxious about notes maturing days or weeks hence. When men no longer doubt their ability to collect from their debtors, they will not postpone settlements with their creditors, and all will go on as usual. As the months of November and December are usually months of dullness and uncertainty, we cannot look for a very general revival of industrial and commercial activity before the beginning of the year, but when we have fairly entered upon 1874—when the business changes now anticipated have been made, and the markets begin to revive under the demands of the spring trade—we shall be able to look back upon the events of the closing months of the current year as one recalls by daylight the troubled visions of a nightmare dream. The country has lost no real wealth, its resources are unimpaired, its credit unshaken. It has within itself as many of the elements of a great and growing national prosperity as it had in 1871 or 1872, and we are confident that next year will be one of general prosperity, if not of unexampled progress. If those who have debts to pay will pay them as promptly as possible, without selfishly and unreasonably hoarding currency for fear things will be worse next week, or next month, than they are this, the busy wheels of trade will soon be in motion again, and the factories and workshops now closed will once more resound with the rattle of machinery and the strokes of the hammer.

The Iron and Steel Association and the Questions of the Day.

The annual meeting of the American Iron and Steel Association will be held at the offices of the Association, No. 522 Walnut street, Philadelphia, on Thursday, November 20th. As the question of undertaking the work of collecting and classifying the ores of the United States for exhibition at the American Centennial will be brought up for discussion, and other matters of national importance will be presented in the report of the able and accomplished Secretary, Mr. James M. Swank, we hope the meeting will be a full one, and that the members will take advantage of the opportunity offered by the dull times to come even from long distances.

The Iron and Steel Association is one of the bulwarks of our tariff system, and as it is probable that a vigorous and determined effort will be made during the coming winter to break down the tariff, it is important that the representative capitalists of the iron trade should seize the opportunity now offered to give decided expression to their views on the subject, in a series of resolutions calculated to strengthen the hands of those who will represent in the Forty-third Congress the productive industries of the country. Any indifference on the part of the iron trade at this time would be construed, by the enemies of protection, to mean a practical abandonment of the principle by those who have been its most

earnest and consistent advocates. Great as has been our progress in the development of our iron resources, there was never a time in our history when our iron manufacturers needed protection more than they need it at this moment. If for nothing else, we need the tariff to strengthen public confidence in the advantage of iron investments, and were it repealed or modified to satisfy the clamor of those who demand "revenue reform" without a clear idea of what it means, and who denounce "protected monopolies" without knowing what they are talking about, our progress in iron production would receive a serious check, to the immediate and permanent disadvantage of American consumers of iron, as well as American producers. Great Britain is steadily and certainly losing her old time advantage as a producer of cheap iron, and her production is now restricted within such well defined limits that any material increase in the American demand would produce a sharp and sustained advance in prices; but we cannot yet afford to consider her a broken and powerless competitor, and the prosperity of our home industries still demands a consistent adherence, on the part of Congress and the nation, to the sound and logical principles of protection. The manufacturing progress of the United States during the past ten years, the substantial strength of our industrial and commercial systems when subjected to the shock of a financial panic more serious than any which has occurred within the memory of the present generation, the general prosperity of the country, and the annual additions to our population by immigration, all attest that the tariff promotes the general welfare in a marked degree, and those who have been its champions in times past cannot now afford to even appear indifferent to the efforts of its enemies to overthrow it. This advice to the oldest and most securely established of our iron trade associations may, perhaps, be quite needless, for we have no reason to suppose that the members will not assemble in strong force and with a full realization of the importance of the business which will be brought before the meeting; but wise counsel is always timely, and even those who recognize their duty most fully are always encouraged in its performance by the presentation of urgent reasons why it should not be neglected.

The meeting will also afford an opportunity, which should not be allowed to pass, of securing an expression of opinion from the Association on the proposed modification of the National Banking law and an increase in the volume of currency secured by pledge of government bonds. Our experiences during the past half year, and more especially during the past two months, have demonstrated beyond question the necessity for a greater elasticity of bank credits, and but few who have given the subject careful thought will affirm that the volume of currency afloat has been equal to the requirements of the country at any time within the past five years. In our judgment, the first step in the direction of banking reform is to abolish the statute which requires the banks to maintain a reserve of legal tenders equal to 25 per cent.—in the case of city banks—of the amount of their demand liabilities. Such a law compels the banks to contract their loans when the greatest possible expansion is demanded to move the crops and effect the commercial exchanges of the country. A restriction of this kind is like the "dead-line" of military prison pens. When it is reached by the merchants and manufacturers the banks must withdraw their protection, and those who are compelled by their necessities to cross it fall into the hands of the enemy, without hope of mercy. A memorial to Congress from the Iron and Steel Association, urging the repeal of this reserve requirement, and advising that the banks be left to manage their business as they find most profitable, untrammelled by any restrictions and limitations, would not fail to have weight with that body, and to promote the cause of banking reform. We do not know whether it was or was not intended to bring this question before the Association, but its importance is so great that we need offer no apology for having urged it upon the attention of the members in advance of the meeting.

Chicago may well be called a city of surprises. Its growth was a matter of surprise, so were its sudden destruction by fire and the rapidity with which it rose in new beauty from its ashes. But the last and greatest surprise is the extent and variety of its manufacturing interests, and the almost startling rapidity of their development. Local estimates, based upon the returns of the last census and other trustworthy statistics, show that the value of its manufactures reaches an annual total of nearly \$180,000,000, and that its productive industries sustain about one-half its entire population. There are at the present time within the corporate limits of Chicago 660

manufacturing establishments, employing 48,429 operatives, representing an invested capital of upward of \$50,000,000, and paying wages before the panic to the amount of over \$27,500,000 per year. Of these, 127 are iron works of various kinds. Considering the fact that commerce has always been considered the only substantial basis of its prosperity, Chicago certainly has reason for congratulation at this very satisfactory showing. Perhaps, after all, the Western gentleman was only "a little, if anything, anticipatory," when he complacently remarked that New York was quite a city, though too far from Chicago to amount to much.

The Government Boiler Tests.

Whether the government tests of steam boilers, now in progress at Sandy Hook and soon to be continued at Pittsburgh, will lead to any practical results or not, remains to be seen. Previous tests of this kind have, we believe, been chiefly useful in showing that like causes do not always produce like effects, so far as steam boilers are concerned, even under like circumstances. We doubt, however, if any progress has yet been made toward a clear and complete understanding of the causes of boiler explosions, which has not already been taught by general experience, since among the theories which the experiments of the commissioners are designed to test are some which have been discussed pro and con for a quarter of a century. Practically, we seem to be but little, if any, nearer a complete understanding of the reasons why boilers blow up or rupture under conditions apparently giving assurance of entire safety, than we were when Colburn wrote his famous treatise on the subject. Whether the skillful and intelligent engineers to whom the management of the government tests has been committed will be able to throw any important light upon the subject, we shall not be able to say until we have their official report, but there is a chance to make these experiments highly useful in determining the inutility of the numberless patent contrivances which Congress has saddled upon steamboat owners, under the supposition—presumably—that they were safety appliances which would tend to protect life and property on steamboats. Were all such contrivances thoroughly tested by a commission of experts before their adoption was ordered, the steamboat owners would be relieved of the necessity of incurring many useless expenses, and such safety appliances as were approved would probably possess some merit beyond the fact that they can be manufactured cheaply and sold at high prices. We do not mean to say that all the patented safety attachments to steam boilers now required by the steamboat law are useless; but the law certainly contains many foolish provisions, which will probably be repealed as soon as the fact that they are of no benefit is fully established by competent authority. We publish on another page a condensed report of the experiments made during the past few days, but reserve our comments until we hear what the commissioners have to say upon the subject.

Banking Reform.

At a meeting of the Associated Banks, held in this city on Tuesday, the committee of nine upon Reforms in the Banking Business submitted a report which merits, and will doubtless receive, careful and intelligent consideration. In another article we have indicated what, in our judgment, Congress should do to make the National Bank law more perfect, and better enable the banks organized under that law to meet the demands made upon them by the business community. In the report of the committee above referred to a plan is presented for the reform of evils for which the banks are themselves responsible, and which, if adopted, would supplement in an important degree the benefits resulting from the enactment of a free banking law. The committee make the following recommendations:

1. No bank shall pay, or procure to be paid, interest upon deposits.
2. No check shall be certified until the full amount is first deposited.
3. Checks upon Associated Banks only received on deposit.
4. Checks upon places out of New York received at rates of discount fixed by Clearing House Committee.
5. Checks will be taken at depositors' risk, and collected through the Clearing House.
6. Checks not good will be returned to the depositor the day following.

As this report will not be definitely acted upon before Tuesday, the 27th instant, at which time a special meeting will be held to consider it, we postpone detailed comments upon the several recommendations, which seem to be eminently wise and calculated to reform many of the gravest abuses which the banks now permit to exist—especially the recommendation that the banks shall not certify checks for a customer in excess of the amount he has on deposit. This is a pernicious system, enabling men without either capital or credit outside of the banks, to carry on

large speculative operations in stocks and securities, to the injury of legitimate business and the disadvantage of the community at large; but we have little confidence in any promise to reform this evil which the banks may make at this time. The old couplet which describes the devil as desiring to be saint when sick, and forgetting his good resolutions when restored to health, will doubtless suggest itself to those who remember that, after the great panic of 1857, the banks adopted a rule to refuse the certification of any checks not drawn against actual deposits.

It is a question whether much of either pleasure or profit to the community results from the efforts of certain of our daily journals to make the situation in the principal manufacturing districts of the country appear as bad as possible. But, however this may be, we would remind those who are sent out to interview manufacturers and make hurried tours of observation in various directions, that, in times like these, newspaper correspondents should be exceedingly careful to report only facts, and not to draw upon their imaginations for materials for their letters. Nothing is easier than for a man who has access to the columns of an influential newspaper, to do another man serious injury in a business way at such a time as this, by exaggerating the difficulties under which he is laboring, making general and unfounded assertions concerning the condition of his business, repeating idle rumors as facts, or incorrectly reporting conversations on business topics. Many instances of reckless reporting have already come to our notice, and some instances of still more reckless telegraphing might be mentioned, which cannot have failed to contribute something, perhaps a great deal, to increase the public apprehension and distrust, and delay the return of confidence, which is now the one thing necessary to a resumption of activity in trade and manufactures. The truth is bad enough, certainly, and any attempt to make the situation seem worse than it really is, for the sake of sensation, is reprehensible in the extreme. If those who control or write for the public journals, great and small, would do what they can to allay the popular apprehension and promote the improvement which has already begun, they would render the community a far more beneficial and honorable service than by pandering to a morbid desire for sensational news.

They have a business-like way of dealing with "economical" railroad directors in Maine, which commends itself to the approval of those who have to travel much by rail. Some time ago the Railroad Commissioners of that State concluded that, in its present condition, the Portland and Oxford Central Railroad was unsafe, and the managers of the company were directed to put the road in repair. Neglecting to comply with this order, the officers of the road were promptly prosecuted by the Commissioners, and a few days ago one of the State judges rendered a decision in the case sustaining the Commissioners, and ordering the company to furnish bonds to the amount of \$20,000, on or before the 10th inst., that the road should be put in immediate and thorough repair, otherwise an injunction would be issued restraining the company from running trains over the road. This decision is eminently just and proper, provided the Commissioners are right in their allegations concerning the condition of the road, as we suppose them to be. There is no reason why the courts should not require railroad companies to keep their tracks and rolling stock in good order, as the condition of being allowed to carry passengers and freights; and if a little of the same kind of law were enforced in other States, we should have fewer fatal accidents resulting from preventable causes. The absolute immunity which railroad managers have hitherto enjoyed in economizing expenses for repairs that dividends might be paid upon watered or worthless stock, has made it profitable for them to slaughter passengers by the score from time to time. This seems to be the Vanderbilt policy of railroad management, and for the same reason that it is cheaper to buy legislators than to elect them, the great speculator probably thinks it is cheaper to occasionally kill passengers than to make provision for their safety.

Scientific and Technical Notes.

The *Frankfort Zeitung*, speaking of the increasing employment of LABOR SAVING MACHINES IN GERMANY, says: The energy and inventive spirit of the people of the United States has ever been bent upon saving labor; up to within the last five years there was no great necessity for our doing so in Germany. Since then, emigration and war have withdrawn thousands upon thousands of laboring men and mechanics, while industry has, with increasing prosperity, gone on expanding among us, and wages have appreciated with a wonderful rapidity. We have thus been

impelled to tax our ingenuity for the saving of labor as much as the Americans have done for the past thirty years. But we find that we are compelled to tax it still further for the saving of coal. While in the United States coal is abundant in every imaginable variety, the reverse is the case in Europe generally. Hence late inventions made and introduced in Germany in machinery have this two-fold aim. The greatest development observable in Germany, and Central Europe in general, has been for the past fifty years in the direction of metallurgical production on the one hand, and in textile industry on the other, and activity in these branches has concentrated in the Rhenish provinces and Westphalia, in Saxony and Alsace. The progress there within the past five years has been astonishing, when we come to consider that war and a great political transformation have engaged our labors, all our energies and a large portion of our men in the prime of life on other fields than those of peaceful, industrial occupation. While in 1866, a year previous to the Paris exhibition, Germany had to import in excess of its exports 82,000 cwt. of machinery, our export of the same exceeded the import in 1872 by 100,000 cwt. While we cheerfully acknowledge that the great Anglo-Saxon nations, England and the United States, have been our masters and teachers till within the past five years, with the exception of some half a dozen branches of manufacture in the machinery line, we have been and are accomplishing great things since. The Vienna exhibition has abundantly proved it, and so do the statistics at hand. While laying prostrate the most warlike nation of Europe, and financially crippling it for a century to come, we have materially advanced in the manufacture of steam engines, first introduced into the country in 1830, in the Rhenish provinces, in connection with mining industry. Next to it we have gas power machinery, to assist smaller industrial branches and for the saving of coal, more extensively manufactured, and quite a variety of mining machinery. From Augustus Borsig's locomotive manufactory, founded in 1840, at Berlin, this specialty has spread to eleven cities, now active centers, which jointly turn out upwards of 1000 locomotives, representing 17,000,000 thalers, and 30,000 railway cars, to the amount of 90,000 thalers annually. The power of our locomotives has been trebled, and we can reduce fares despite higher coal and wages.

During the past few days two

NEW AMERICAN BUILT IRON STEAMERS have reached this port from Wilmington, Delaware, where they were built at a cost of \$250,000 each. They are very creditable specimens of our increasing skill in this branch of naval architecture. The first to arrive was the steamer Knickerbocker, belonging to the Cromwell line to New Orleans. The Knickerbocker is an iron vessel of 3000 tons register, being 280 feet in length, 31 feet breadth of beam, and 23 feet depth of hold. She cost about \$250,000. The iron beams of her frame are most substantial, and the plates are from 9-16 to 11-16 of an inch in thickness. Her lower deck is constructed of Southern yellow pine, and the main deck of white pine, each four inches in thickness. She is fitted with four water-tight bulkheads, running from the floor to the main deck, beside partial bulkheads and water-tight compartment for the shaft, as well as a water-tight trunk surrounding the shaft from this compartment to the engine bulkhead. An iron house on the main deck over the engine and fire room compartments gives a thorough protection against fire, and a companionway safeguard is also provided as a barrier to the sea, which might otherwise reach the fire room and extinguish the fires. The new steamer is fitted with a vertical inverted condensing engine, whose cylinder is 44 in. in diameter, and whose piston has a 72 inch stroke. There are four tubular boilers, one pair being placed forward of the other. The boilers and machinery are all of the most substantial kind. A hydrostatic pressure of 105 pounds to the square inch has already been put upon the boilers by the builder. On her trip from Wilmington to this port the Knickerbocker made 10 knots per hour, though the fires were kindled in only two of the four boilers with which she is provided. She is built in all respects according to the measure of the highest grade of the Ship Masters' Association, of New York, having been under its inspection during construction. The Knickerbocker is owned by Messrs. Clark & Seaman, and will be placed at once on their Cromwell line between New York and New Orleans. She will sail from this port on the 15th inst. The Knickerbocker will be commanded by Capt. E. V. Gager, the Commodore of the Cromwell line, who has held the command of each new vessel as she appeared during the past sixteen years. The chief engineer is E. M. Staats, who has for a long time been in the service of the company. The other steamship is also iron, and, like the Knickerbocker, is from the extensive ship yards of Wilmington. In size, cost, elegance and general appearance, the two vessels are not unlike. The vessel is called the General Whitney, and was built at an expense of about \$300,000. She belongs to the Metropolitan Steamship Company, and bears the name of its president. She will ply between this port and Boston. She is 245 feet in length, 40 feet breadth of beam, and 28 feet depth of hold. She is registered at 1848 tons, and is built of iron. She is furnished with a pair of inverted engines, with a cylinder of 36 inches diameter and a piston of 60 inch stroke. There are three cylindrical furnaces to each of the boilers. The engines and boilers are carefully inclosed in iron, the engine room is unusually commodious and well lighted, and a convenient tool room is close at hand. The vessel has five separate water-tight compartments. She differs from all steamers heretofore constructed in that she is supplied with four independent hoisting engines, operating seven freight cranes

stationed at separate points. The time consumed in receiving or discharging cargo is thus materially reduced. Her port shutters, too, are constructed on a new design, and, though remarkably heavy, can be easily worked by one man. The General Whitney is to be heated throughout by steam. The new steamer is to ply between this port and Boston as a freight boat only, no regular accommodations being provided for passengers.

Messrs. Riehle Bros., of the Philadelphia Scale and Testing Machine Works, have made some interesting

TESTS OF MANILA ROPE, the results of which are important to many classes of our readers. The strength of the several sizes tested is shown as follows:

No.	6 thread	Weight, pounds.
1	6 "	625
2	6 "	615
3	6 "	605
4	6 "	595
5	6 "	585
6	6 "	575
7	6 "	565
8	6 "	555
9	6 "	545
10	6 "	535
11	6 "	525
12	6 "	515
13	6 "	505
14	6 "	495
15	6 "	485
16	6 "	475
17	6 "	465
18	6 "	455
19	6 "	445
20	6 "	435
21	6 "	425
22	6 "	415
23	6 "	405
24	6 "	395
25	6 "	385
26	6 "	375
27	6 "	365
28	6 "	355
29	6 "	345
30	6 "	335
31	6 "	325
32	6 "	315
33	6 "	305
34	6 "	295
35	6 "	285

The above tests were made Dec. 23, 1872, on one of Riehle Bros. patented "U. S. standard testing machines," for Messrs. Edw. H. Fittler & Co., and can be relied upon as correct, as they were made very carefully, and upon the machine that tests were made for the United States Navy Department.

Since our last account of the condition of THE EAST RIVER BRIDGE considerable progress has been made. Workmen are busily engaged upon both towers, but the force is small and the progress is not readily apparent. The Brooklyn anchorage of the bridge is at James street, about 800 feet from the tower. The masonry of the anchorage is at present four feet above ground. Six derricks are kept in constant use for setting stone, and the work is rapidly advancing. The lower half of the arch centers of the Brooklyn tower have been completed, and the workmen are now placing stone on the archways. The arches will not, however, be completed this fall. The tower is now 225 feet above high water, and nearly on a level with the top windows in Trinity Church steeple. When finished the entire structure will be 278 feet high. To reach the top of the tower it is necessary to ascend a winding stairway containing nearly two hundred steps. When the top is reached, however, the visitor is repaid for his labor by the magnificent views of the surrounding scenery. Sixty workmen are employed on the New York tower, which is now 120 feet above high water mark. The "boom" derricks recently in use have been removed, and balance derricks, similar to those employed at the Brooklyn tower, have been erected in their stead. The work of building the tower above the roadway is advancing quickly, and operations will be continued until frost renders a suspension of mason work necessary. Mr. Martin, the engineer, says that, owing to the scarcity of working room on the towers, few men can be employed. When work begins on the New York anchorage a large force will be employed and the work pushed rapidly forward. The only obstacle in the way of continued work on the towers is the approach of cold weather.

The Situation in the Delaware and Lehigh Valleys.

Latest advices from Philadelphia and vicinity report that the iron workers and manufacturers of the Delaware Valley have not suffered to any great extent from the recent panic. The Delaware Rolling Mill and Axle Works resumed operations on the 3d instant, after a stoppage of two weeks, with one-fifth of their usual force of workmen and 15 per cent. reduction in wages. The American Sheet Iron Works, McClees & Co., proprietors, continue at work on half time with 100 men. The Philadelphia Stove Works have made no reduction in wages, and are running full time with their usual force of men, except in the foundry, which is run four days per week. The Philadelphia Manufacturing Company, whose production consists of bridge work, bolts, nuts, &c., are as busy as usual. Their contracts have not been revoked nor have payments been delayed. The Warren Foundry and Machine Company have made no reductions in wages or working hours, and are giving employment to about as many men as usual. The production of this establishment consists chiefly in gas and water pipes, and as these are consumed chiefly in the public works of large cities, which can afford to pay promptly the bills of contractors, the hard times have not seriously affected the business. At Stanhope, near Philadelphia, the Musconetcong Iron Company have two furnaces, the smaller of which has been blown out on account of the large accumulation of iron. About 35 or 40 men have been deprived of employment at the furnace, and a large number more at the mines. Of the three stacks of the Andover Iron Company only one is out of blast, and as this was running for about seven years without interruption, it was blown out for repairs and enlargement. The other two are to be kept in blast all winter, as the company

think it safe to accumulate stock, even in the present condition of the market.

Across the river the condition of affairs is much the same as that on the New Jersey side. The Glendon Iron Company, at South Easton, have four out of five stacks in blast and retain their usual force of men. The rolling and wire mills of Stewart & Co. are closed, with no prospect of being soon reopened. The Lehigh Valley Car Works have as yet made no other change than to reduce working time one hour per day.

Messrs. Young & Seabough's foundry is still running on small orders, but the proprietors are uncertain of the future.

From the furnaces and rolling mills along the Lehigh Valley the accounts vary but little. Most of them are reducing their working force and cutting down wages. Several furnaces have blown out, and a number of the mills are closed, and more will probably follow unless there is an immediate improvement. Some of the large companies are embarrassed for ready money, and are compelled to pay out certificates of indebtedness to the men for 70 or 80 per cent. of their wages. The Bethlehem Iron Company have suspended work upon their additions and improvements, but are endeavoring to avoid discharging more men than is necessary. The workmen are manifesting much sympathy for the masters, and are disposed to accommodate themselves to the changed conditions with good grace. But few strikes are reported, and no difficulty has been experienced in filling the places of those who have quit work.

At Allentown the situation is reported quiet, without any "panicky" feeling. The Allentown Rolling Mill Co., which has two furnaces, extensive rolling mills and machine shops, have blown out one stack, stopped their rail mill and reduced their working force from 900 to 150. It is proposed to stop altogether within a few days and await the return of better times. The Glen Iron Works are stopped for the time, but the company propose resuming at an early day. The axle works and machine shops of Messrs. W. T. Mosier & Co. are running on part time with a reduced force and lower wages. The Lehigh Valley Spike Works stopped last Saturday for a week, and Burke & Co.'s foundry is still running, but with a prospect of stopping within a few days. Cole & Hulman's boiler works are running on old orders, and the tube and pipe works of Allright & Bros. had not suspended at last accounts.

Mining and Iron Making in New Jersey.

Reports from various parts of New Jersey indicate that the iron mining interests of that State have suffered quite severely from the effects of the panic through which we are now passing. A correspondent of the *Tribune*, writing from Rockaway, says that the Rockaway Rolling Mill has reduced its force one-half, and wages 25 per cent. for skilled labor. At the Union Foundry and Machine Shops, in the same place, work is practically suspended, only 25 men being retained. The writer adds:

This town was formerly sustained to a considerable extent by the neighboring mines as well as by the iron works; but the larger mines have now villages of their own, which have grown up around them, and contain stores from which the miners and their families can obtain all the necessities of life. About three miles distant, in a northeasterly direction, is the Hibernia mine, from which about 24,000 tons of ore are raised each month, and which employs 500 men. A part of this mine is worked by the Bethlehem Iron Company, of Pennsylvania, who have not yet paid their men for September, and propose to pay from November 1 one quarter in cash and three quarters in six months' due bills. The rest of the Hibernia mine is worked by the Glendon and the Andover Iron Companies, who have paid their men in full to date, but have ordered a reduction of 12½ per cent. from the 1st of November.

The Mount Hope mine is about three miles from the village in a northwesterly direction. It employs 400 men, who raise an average of 20,000 tons of ore each month. On the 1st of October all the unmarried men were discharged, and the wages of those remaining were reduced from \$2 to \$1.60 a day. On the 1st of November there was a further reduction to \$1.25 per day, one-quarter cash, and the rest in orders or due bills, payable in six months. Orders have been issued for a still further reduction in the fore. The mines are worked by the Lackawanna Iron Company, and the rumor that married men are to be discharged from the mines creates considerable indignation among the people here, who say that there is nothing in the present condition of trade which can justify such a course on the part of so rich a corporation. The general feeling is that the stagnation in business is only temporary, and will be of brief duration, and that mine owners and manufacturers ought to make every reasonable sacrifice to keep their men together, and to supply them with enough work to provide them with food and lodging for the winter.

Another correspondent, writing from Dover, says that at the Dickerson mine, in Rockaway township, and the Baker mine, in Dover, both operated by the Allentown Iron Company, the wages have been reduced from \$2 to \$1.50 per day. In the Huff mine, the operators on October 1st reduced the force one-half. Wages were kept up to \$2 a day to Nov. 1, when they were cut down 12½ per cent. The correspondent continues:

The Irondale and the Richmond mines, about a mile and a half from here, are worked by the Thomas Iron Company, whose principal furnaces, eight in number, are on the Lehigh, above Allentown. Four of their furnaces have been blown out, and they are greatly reducing their works. They employ 200 men in the mines near here, and as they are considerably behind in payment of wages, it is thought that some reduction will be made, though none has been

announced as yet. The Crane Iron Company work six mines, one of which is about two and a half miles above here. They are the Randall Hill, Pequest, Danville, Schofield, Baker and Irondale. They employ not more than 250 men, and have made no reduction except in wages—12½ per cent. from the \$2 per day, which was the mining standard price until within a few weeks. The agent says that it is their purpose to keep on a month or two longer and then be governed by circumstances. The Port Oram Iron Works, a short distance from this place, employ about 35 men. The proprietor informed your correspondent that he had made no reduction except in wages from \$2 to \$1.50 a day, and that he expected to continue at work unless things look very much worse than now. He thought that neither miners nor manufacturers would have long to wait for a revival of trade. Prices had been too high for years past, both for iron and for labor; they would soon settle at a fair level, and business would then become good again. He took a very cheerful view of the situation.

This has been generally the case with those with whom your correspondent has talked in this section. The miners are of a superior class—three-fourths of them being Cornishmen—industrious, sober and thrifty. Inquiry at the savings banks elicited the opinion that a large number have saved money enough to carry them through a few months of idleness very comfortably, and the opinion was expressed that a good deal of money had been saved in a more primitive way than by depositing it in savings banks. Others, who are brought into daily contact with the miners, and who should be expected to know their habits thoroughly, did not believe that one miner in ten saved money, but they are very confident that no married men would be permitted to go without work, and they thought the single men could take care of themselves somehow. The men seemed to understand the difficulties which beset their employers and submit to the reduction of their pay without complaint.

The Situation at Pittsburgh.—The Pittsburgh Commercial says: Some inconsiderate creature telegraphed from here to the press elsewhere that the iron furnaces here had suspended work because the owners tried to enforce a ten per cent. reduction in wages, and that these furnaces employed 1750 men regularly, and 10,000 incidentally, including those who supplied them with fuel. Now, there are but eleven pig metal furnaces in Pittsburgh. These furnaces do not employ 1750 men regularly, and as they are run with coke furnished from Fayette and Westmoreland counties, the entire suspension of all of them would affect no one in the county beside those employed about them, and the number of men engaged in supplying them with fuel is much nearer 500 than 10,000. It so happens, however, that only two of the eleven furnaces have stopped on account of the reduction of wages, and the number of men thrown out of employment on that account is therefore comparatively small. It is not true, therefore, that the monetary difficulties have "worked more disastrous results" in Pittsburgh than anywhere else. We have suffered, as a matter of course, but have not suffered half as badly as Philadelphia and New York seem to have done. Our banks have paid out currency in full for all checks drawn on them, during the entire panic, and continue to do so; there have been but few failures or suspensions; our mills are nearly all running; and if the whole country does not become infected with groundless fears, there will be such a certain but gradual return to a better state of affairs as will keep things moving, in the meantime, even if they have to move slowly. We do not attempt to hide from ourselves and the world that the monetary disturbance has inflicted a heavy blow upon our prosperity, just as it has everywhere else, and that it will require a spirit of concession and accommodation on the part of all persons concerned to bring about a better condition of affairs; but we protest against such representations as we have quoted, and trust that our friends in the newspaper press will refrain from all attempts to make things look worse than they are here or elsewhere.

Snow Melting.

It is but a few days since the morning dailies gave elaborate and half ludicrous accounts of a project for keeping open the canals in winter by heating them by means of steam pipes. The calculations were seemingly carefully prepared, and sufficiently promising to the mind of the projector to warrant considerable labor in the evolution of his scheme. But there is no reasoning with a laugh, in mechanics as in everything else, and the promoter of the plan may esteem himself fortunate in being extinguished by a method so effectual as concerns the public and so inexpensive as concerns himself. There are many things involved in the winter navigation of canals aside from the mere keeping of the channel clear; and this latter could doubtless be secured by mechanical at a much less cost than by thermal agencies. It is on record that a propeller some years since broke her way through sheeted ice on the Erie Canal, and the fracture of the impeding material could, if the plan were to be attempted, be secured by special machinery much more efficaciously than by the screw which gave the results just mentioned. It is not likely that our ferry boats will ever adopt in practice the logical deduction from the fact referred to, and find for rapid transit across New York waters in midwinter any better plan than that of butting through ice-floes by the impact of the hull. But I am straying somewhat from the matter in hand—that of getting ice and snow out of the way by the application of artificial heat, a subject by no means new, for it was debated some few years since in one of our scientific societies with much advancing of theories, but with little of

practical suggestion. One member, in speaking of the clearing of streets, proposed a traveling apparatus to gather up the snow as the machine passed along, somewhat after the same fashion that a hay loading machine is designed to gather up hay and transfer it on an endless apron to the vehicle, except that in this case the transfer was to be to a sheet metal surface heated by a furnace provided underneath, and constituting the rear portion of the device. Of course the water, resulting from the melting, was to flow off to the street and thence to the sewers. It was objected to this, that the water would freeze and form a smooth surface worse than the snow, whereupon another party advocated the use of a downward blast in the smoke stack of a traveling furnace to drive the hot products of combustion against the snow, and insure its speedy dissolution; another suggested the use of steam jets applied in similar manner, and expressed the opinion that this would clear the streets much more quickly and cheaply than the usual employment of picks, shovels and carts. If the plan were feasible at all, the best results would doubtless come from a combination of the two last indicated, a steam jet carrying the hot products of combustion down against the snow. The utility of steam for snow melting was, I recollect, demonstrated in a small way, a few years ago, on the sidewalk in front of a downtown warehouse in this city. A nozzle from a flexible hose was carried over the surface, and the issuing steam soon made it clear and dry, but whether with "economy of fuel" there is no data to determine.

But the idea of snow melting, and, as we shall see, of ice melting as well, still has its hold upon the minds of inventors. I find in the latest issue of the *Official Gazette* of the Patent Office notices of two inventions relating to these matters. One is for a "means of keeping open the navigation of canals, etc.," and its gist is indicated by the claims, as follows: "1. A vessel provided with a furnace, boiler, super-heater and tank, or equivalent device, for discharging super-heated steam into or upon the water of the river or canal, for the purpose of raising the temperature of the said water, to prevent the formation of ice. 2. A boat or movable water vessel provided with a furnace or heater, and with external radiating pipes arranged to receive heat from the said furnace and diffuse it into or upon the water of a navigable stream, for the purpose of keeping the navigation open. 3. A boat or movable water vessel, provided with a furnace, steam generator and means for discharging steam into or upon the water in sufficient quantities to open or prevent the closing of navigation on canals or navigable streams in winter." The other device referred to is for a "machine for melting snow," in which "movable plates are so combined with the furnace that they may be alternately heated and lowered, and against which the snow is driven by a revolving brush cylinder." The inventor claims "the combination, in a machine for melting snow, of a furnace, a movable plate or plates receiving heat from said furnace, and a brush or brushes so arranged as to throw the snow against said plate or plates to be melted."

I have thus briefly sketched a number of rather unique inventions that have been brought to my notice during the past few years, for accomplishing a very desirable, but somewhat difficult, object. Whether any of them will fulfill all the conditions of success remains to be seen; but whether success or failure attend the effort, credit is due to the men who, with a slender theoretic basis, attempt, with much practical audacity, the remedy of a public nuisance in our streets, or the removal of an apparently insuperable obstacle to internal traffic on our slack water lines in winter.

JAMES A. WHITNEY.

The Situation at New Britain.—A correspondent of the *Herald*, writing from New Britain, Conn., under date of the 10th inst., says: This town has sprung into active existence within the last ten years. It has a population of 12,000, and the estimate is that two-thirds of that number are engaged in manufactures. There are 500 working people thrown out of employment, but a large majority of that number manage to pick up casual jobs around the workshops. There is no actual distress.

Running on Half Time: Landers, Frary & Co., cutlery and general hardware, 800 hands in two factories; P. & F. Corbin, builders' hardware, 400 hands; Stanley Rule and Level Company, 250 hands; Worth & Judd, hardware, 150 hands; Taylor Manufacturing Company, 50 hands; Judd & Blakesley, hardware, 50 hands; Humason & Beckley, hardware, 100 hands; New Britain Bank Lock Company, 30 hands; Churchill, Lewis & Co., jewelry, 50 hands.

Running on Three-Quarter Time: Russell & Erwin Manufacturing Company, builders' hardware, 600 hands; Stanley Works, hardware, 250 hands; Edward Dorne, hardware, 15 hands; National Wire Mattress Company, 25 hands; New Britain Rubber Company, 25 hands.

Running on Full Time: Malleable Iron Works, 50 hands; New Britain Knitting Company, 300 hands; American Hosiery Company, 300 hands; N. B. Whitehead Company, 30 hands; American Basket Company, 25 hands.

Bad Luck with a Large Casting.—Considerable interest was excited at Cold Spring, New York, on the 4th instant, by the announcement that a large cannon was to be cast at the foundry in that place, which would require 33 tons of molten iron for the rough casting, and which was to weigh 60,480 pounds when finished. A number of scientific gentlemen and interested spectators were gathered to witness the work; but, unfortunately, when about half of the metal was safely conducted to the mold, the weight and height of the column burst the box, and the entire contents escaped. The mold destroyed, the whole of the molten metal had to be drawn from the furnaces and cast in the sand, that it might be reheated for another trial. The loss is variously estimated, some placing it as high as \$5000.

Trade Report.

Office of THE IRON AGE.
WEDNESDAY EVENING, NOV. 13, 1873.

During the past week there has been no important change in the situation of affairs in Wall street. The action of the Bank of England in advancing the minimum discount rate to 9 per cent. on Friday last has been the chief topic of conversation in financial circles. Only on two occasions has the rate been higher since 1844, and on both of those the bank act was suspended. The action of the bank excited some alarm, but did not precipitate a panic, and the money market in London is reputed quiet. The industrial and commercial situation is discussed in another column, and it is only necessary in this place to say that while no actual improvement can be reported, there are indications of returning confidence. The action of some of our largest merchants in throwing upon the market at reduced prices, for cash in 30 days, the stocks of goods manufactured for the fall trade, is calculated to set things moving again, and the result of the policy is that a great deal of money which would have been locked up in the country banks, or in the safes of the country merchants, until it was necessary to buy for the spring trade, will come back to New York to be used in trade and manufacturing. Most, if not all, the great houses lately embarrassed have effected satisfactory arrangements with their creditors, and will go on as usual.

The money market has been very easy during the week, and borrowers on call have been freely accommodated at 5 @ 6 per cent. The banks report a considerable gain in legal tenders, and have now about \$25,000,000, against about \$5,000,000 during the worst of the panic.

The gold market has been strong during the week, with an advance on the premium, as will be seen from the following comparison of highest and lowest daily quotations:

	Highest.	Lowest.
Thursday	107 1/2	106 3/4
Friday	107 1/2	106 3/4
Saturday	107 1/2	106 3/4
Sunday	107 1/2	106 3/4
Tuesday	107 1/2	106 3/4
Wednesday	107 1/2	106 3/4

A dispatch received from London, to-day, announces that the Committee of the Stock Exchange have adopted a resolution that four shillings (British) per dollar (American) shall be the rate of exchange after the 3d of December.

The stock market, which was unsettled during the early part of the week, has become steady and strong, with the principal dealings in Western Union, New York Central, Lake Shore, Wabash and Union Pacific. Government bonds continue dull, moving in sympathy with gold. There is some improvement in the market for desirable railroad bonds, but few investment purchases are made.

The foreign trade movement for the week is shown as follows:

	1871.	1872.	1873.
Tot. for week.	\$5,323,017	\$6,697,573	\$5,022,754
Prev. reported.	\$38,016,710	\$69,078,729	\$38,466,015

Since Jan. 1... \$334,339,727 \$377,770,302 \$343,488,769

Included in the imports of general merchandise for the week are:

	Quant.	Value.
Brass goods	56	\$4,955
Bronzes	60	9,315
Chains and anchors	3	363
Copper	2	5,136
Cutlery	72	2,388
Guns	55	8,564
Hardware	44	6,579
Iron, reg. tons	853	3,425
Iron, cast, tons	25	4,983
Iron, other, tons	158	18,229
Lead, pigs	10,060	71,106
Metal goods	133	18,394
Nails	19	918
Needles	8	5,724
Platina	1	1,293
Per. caps.	11	1,693
Saddlery	4	349
Steel	925	21,148
Tin boxes	10,039	96,248
Tin, 924 slabs	36,335	9,882
Wire	106	16,070

For the week... \$5,323,017 \$6,697,573 \$5,022,754
Prev. reported... \$38,016,710 \$69,078,729 \$38,466,015

Since Jan. 1... \$334,339,727 \$377,770,302 \$343,488,769

Total for the week... \$220,380
Previously reported... \$3,736,185

Total since January 1... \$4,035,543

Government bonds closed as follows:

	Askd.	11 1/2
U. S. 1881, reg.	11 1/2	11 1/2
U. S. 1881, c.	11 1/2	11 1/2
U. S. 5-20 1882, reg.	106 1/2	106 1/2
U. S. 5-20 1882, c.	106 1/2	106 1/2
U. S. 5-20 1884, c.	107 1/2	107 1/2
U. S. 5-20 1886, c.	107 1/2	107 1/2
U. S. 5-20 1888, c.	107 1/2	107 1/2
U. S. 5-20 1890, c.	111 1/2	111 1/2
U. S. 5-20 1892, c.	111 1/2	111 1/2
U. S. 10-40 reg.	104 1/2	104 1/2
U. S. 10-40 c.	104 1/2	104 1/2
U. S. Current 4-20s	109	109 1/2
New Fives, 1881	106 1/2	106 1/2

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	89 1/2	89 1/2
Lake Shore	93 1/2	93 1/2
Rock Island	87 1/2	87 1/2
New Jersey Central	89	89
Del. Lack. and West.	88	87 1/2
Wabash	39 1/2	37 1/2
Harlem	310	308
Western Union Telegraph	53 1/2	53 1/2
Northwestern	37 1/2	37
Northwestern, Preferred	58 1/2	57 1/2
Milwaukee & St. Paul	36 1/2	35 1/2
Panama	30 1/2	29 1/2
Pacific Mail	30 1/2	29 1/2
Erie	42	39 1/2
Ohio & Mississipp.	34 1/2	33 1/2
Union Pacific	17 1/2	16 1/2
C. C. & Ind. Central	19	18 1/2
Hannibal and St. Joseph	19 1/2	19
Hannibal & St. Joseph preferred	25 1/2	24 1/2

GENERAL HARDWARE.

There is no change to report in the condition of the trade this week. Orders continue light, no desire being manifested by buyers to accumulate stocks of even seasonable goods; still some houses report a fair trade, and remittances continue to come in in a more satisfactory manner than for many weeks previous; there is, however, room for still greater improvement in this respect.

Sargent & Co. have issued the following list for their new Patent Lever Door Bells, &c.:

SARGENT'S PATENT LEVER DOOR BELLS.—PACKED WITH SCREWS.

	Per Doz.
No. 300, Berlin Bronze Lever, Round Plate, Porcelain Knob	\$15-00
No. 301, Berlin Bronze Lever, Oblong Plate, Porcelain Knob	15-50
No. 318, Nickel Plated Lever, Round Plate, Porcelain Knob	25-00
No. 320, Silver Plated Lever, Round Plate, Porcelain Knob	10-00
No. 321, Silver Plated Lever, Oblong Plate, Porcelain Knob	20-00
No. 323, Silver Plated Fancy T Lever, Porcelain Knob	24-00
No. 331, Bronze Metal Lever, Oblong Plate, Fancy Bronze Metal Knob	22-00
No. 339, Bronze Metal Fancy T Lever	24-00

	Per Doz.
No. 350, Berlin Bronze Lever, Round Plate, Porcelain Knob	21-00
No. 351, Berlin Bronze Lever, Oblong Plate, Porcelain Knob	21-50
No. 358, Nickel Plated T Lever	31-00
No. 370, Silver Plated Lever, Round Plate, Porcelain Knob	25-00
No. 371, Silver Plated Lever, Oblong Plate, Porcelain Knob	26-00
No. 379, Silver Plated Fancy T Lever	30-00
No. 381, Bronze Metal Lever, Oblong Plate, Fancy Bronze Metal Knob	28-00
No. 389, Bronze Metal Fancy T Lever	30-00

	Per Doz.
No. 300, Berlin Bronze Lever, Round Plate, Porcelain Knob	\$18-00
No. 301, Berlin Bronze Lever, Oblong Plate, Porcelain Knob	18-50
No. 318, Nickel Plated Lever, Round Plate, Porcelain Knob	28-00
No. 320, Silver Plated Lever, Round Plate, Porcelain Knob	22-00
No. 321, Silver Plated Lever, Oblong Plate, Porcelain Knob	23-00
No. 323, Silver Plated Fancy T Lever	27-00
No. 331, Bronze Metal Lever, Oblong Plate, Fancy Bronze Metal Knob	25-00
No. 339, Bronze Metal Fancy T Lever	27-00

	Per Doz.
No. 350, Berlin Bronze Lever, Round Plate, Porcelain Knob	\$25-00
No. 351, Berlin Bronze Lever, Oblong Plate, Porcelain Knob	25-50
No. 358, Nickel Plated T Lever	35-00
No. 370, Silver Plated Lever, Round Plate, Porcelain Knob	29-00
No. 371, Silver Plated Lever, Oblong Plate, Porcelain Knob	30-00
No. 379, Silver Plated Fancy T Lever	34-00
No. 381, Bronze Metal Lever, Oblong Plate, Fancy Bronze Metal Knob	32-00
No. 389, Bronze Metal Fancy T Lever	34-00

Discount 30 per cent.

Imitation Berlin Bronze, Bronze Metal Knob.

No. 118, Imitation Berlin Bronze, Pack'd with Screws... per gross, \$10-50 net

LETTER BOX PLATES.

No. 25, Berlin Bronze.

No. 29, Bronze Metal.

No. 29, Bronze Metal, Pack'd with Screws... 12-25

Discount 10 per cent.

10 per cent. extra discount for prompt cash on all the above.

In sympathy with the recent decline in the gold premium, the manufacturers of Cordage have reduced the price of Manila, Sisal and New Zealand Cordage half a cent per pound.

Below we publish William Wall's Sons' revised list, dated 11th instant:

Manila Cordage, sizes above 12 th'd... 17 1/2 cts.

5-16 in. diam. 6 th'd and 9 th'd (4 in. and 5 in. diam.)... 18 1/2 "

Manila Cordage, 12 th'd (5 in. diam.)... 18 "

" Hay Rope, 6 th'd and 9 th'd... 18 1/2 "

" Cordage, bolt rope yarn... 19 1/2 "

9 th'd... 20 1/2 "

Tar'd Manila... 17 "

Fine Tar'd Manila Lath Yarn... 18 1/2 "

Sisal Rope, 6 th'd and 9 th'd... 18 1/2 "

" 12 th'd and Hay Rope... 16 "

New Zealand Cordage, sizes above 12 th'd... 15 1/2 "

5-16 in. 6 th'd and 9 th'd (4 in. and 5 in. diam.)... 16 1/2 "

New Zealand Cordage, 12 th'd (5 in. diam.)... 16 "

Hay Rope... 16 "

The following is the substance of a telegram from Waterbury, Conn., dated 11th instant:

"Brass is reduced 4 cents; scrap, 3 cents; and Rivets and Burs, 8 cents per lb. No change in German Silver. For other changes see new list."

Up to present writing the new list has not been received in this city, and we omit our usual quotations of Sheet Brass, Brass and Copper Wire, &c. The following is the new list of

BELT AND HOSE COFFER RIVETS AND BURS.

Prices per lb. 49 53 54 56 58 63 64 68c

Nov. 8 9 10 11 12 13 14 15

Braziers Rivets, 47 cents per pound. Discount 10 per cent.

The improved demand for Nails mentioned last week continues, and prices are unchanged.

We quote the card rate, viz., \$4-75 for small lots. Orders from 25 to 100 kegs are easily placed at \$4-50, net, for 100, and for larger orders, say, 300 kegs and upward, this figure could be shaded.

In foreign Hardware there is no change to note, either in the tone of the market or in values. Holders here are firm in their views, and we are assured that the stocks of imported Hardware, notwithstanding the long continued interruption of trade, are by no means large for this season, and in several important lines stocks are too badly broken to fill a fairly assorted order. The stock of Coil Chain and Peter Wright's Anvils is unusually light for this time of year, and our quotations are fully sustained. Stub's Files of desirable sizes are almost wholly out of the market, and each fresh arrival is required to fill back orders.

The Biddle Hardware Company, of Philadelphia, have published the following card under date of 10th inst.:

On account of the low premium of gold, we have determined to offer our stock of foreign goods, for immediate orders, at the lowest gold prices for currency (no premium added).

We have one of the largest assortments of English and German Hardware in the country. We will also offer inducements on our large stock of American Hardware, and parties wishing to buy had better examine our prices before purchasing.

Leffert's Enamel Works have recently added to the general line of Enamelled Sheet Iron Goods a fine assortment of Enamelled Door Plates, Push and Pull Plates, Door Numbers, Name Plates, Watch and Clock Dials, Bell Pulls, Druggists, and other Drawer Pulls, Descriptive Tablets for Hotels, Bar Rooms, etc.

Although these goods open a new branch of Hardware manufacture in this country, they have been for many years considered almost a staple among the Hardware dealers of Europe, and may be seen in the English steamships running to this port. They are finished with all the elegance of fine porcelain without the clumsy appearance which porcelain thick enough for the purpose presents. The infinite variety in which these goods can be produced ought to make them popular, as they can, upon short notice, be finished to any design required.

A descriptive catalogue and price list is published, the trade discount from which is 20 per cent. Full particulars of this useful application of the enameling art can be obtained at the office of Leffert's Enamel Works, No. 90 Beekman street, where samples of the goods may be seen.

Although there have been so many different Hat and Coat Racks put on the market in the past few years, we think a new kind just introduced by Landers, Frary & Clark has advantages over any others, and is worthy the attention of the trade. It is made entirely of iron, and consists of five hooks, fastened to a horizontal bar, over which is a shelf made of light rods, with considerable space between them, so arranged that it can be either turned up against the wall when not used, or turned down to serve as a shelf. It is nicely decorated. Price \$18 per dozen, less 40 per cent. discount.

The Star Tool Company have just issued a new catalogue of their manufactures, handsomely printed and illustrated with cuts, including various kinds of Try Squares and Bevels, Gauges, and Blind and Window Trimmings, etc. The list prices are, we believe, unchanged.

J. W. King, of the late firm of H. & J. W. King, has bought the Empire Mills, where he manufactures Twines of all kinds, including both Flax and Tow, in balls and hanks; also Broom and Sall. Graham & Haines have been appointed agents, and can furnish price lists.

IRON.

American Pig.—The trade continues in the same dull condition, and prices still on the downward scale. We do not hear of any more Lehigh furnaces having blown out, though it is considered only a question of time. They are not purchasing any ore, and if commercial affairs do not assume a brighter aspect, many more will go out of blast as fast as their stocks of ore are used up. No. 1 Iron may now be quoted at \$33 @ \$35; No. 2, \$29 @ \$31; and Gray Forge, \$24 @ \$26. We notice a small sale of Gray Forge at \$24, and 50 tons each, No. 2 and Forge, on private terms.

Scotch Pig.—The demand for Scotch Iron continues light, though holders are not forcing their stocks, and prices are held about steadily. Glengarnock is quoted at \$38 @ \$40, though sales, when effected, are generally at the inside figure. Eglington is very scarce, there being little, if any, here in first hands. Coltness quoted at \$43 @ \$45. Gartsherrie is all in hands of one party, who is peddling it out at \$48. A lot of Eglington is reported sold at Philadelphia at \$43, 30 days.

Bar.—The demand for Manufactured Iron continues very light. We reduce our quotations from \$22-50 per ton.

Old Rails.—There is scarcely anything doing in Old Rails, and lots when forced on the market have to be sold at ruinous figures.

Double Head Rails are mostly under control of one party, who is not offering at the moment. T Rails quoted nominally about \$36. A lot of 150 tons Old Bridge and T sold for \$32-50.

New Rails.—In absence of trade prices remain nominal at \$60 @ \$62, gold, for New English, and \$68 @ \$70, currency, for American.

Scrap.—The market for Scrap continues quiet and depressed, and very low figures have been quoted. We refrain from making quotations this week.

METALS.

Copper.—The market for Ingot Copper has ruled exceedingly dull for a month past, the natural effects of the panic. Sales have been very light and at exceedingly low figures, embracing only such lots as were forced out by parties needing prompt cash. The larger and stronger holders withdrew from the market, appearing to feel confidence in the future, and preferred carrying their stocks than to submit to the losses which they would have incurred by pushing them out. This week, however, has brought about a decided change. There has been an active speculative demand, mostly for future delivery, and prices have reacted fully 2c. @ 3c. per lb. from the lowest point touched, and closes very strong, with the tendency still upward. The sales of Lake embrace 700,000 lb. each, at from 20c. @ 22 1/2 c.; 700,000 lb., November, December and January, at as high as 22 1/2 c.; 300,000 lb., December, January and February, at 23c., and 2,000,000 lb., November to April, on private terms. There has been some demand for Minnesota Copper for export, and we notice a sale of 100,000 lb., to be shipped to France, at from 22c. @ 24c. per lb. We quote at the close at 22c. @ 22 1/2 c. for cash, and 23 1/2 c. for future delivery. Manufactured Copper is irregular; the official quotations are not changed, but they are not strictly adhered to by the trade, and cash buyers can easily obtain concessions. We reduce some of the figures, but they might still be shaded a trifle. We quote at 36c. for New Sheathing, 38c. for Braziers, 45c. for Nails, 30c. @ 21c. for Old Sheathing, 25c. for New Yellow Metal Sheathing, 32c. for Bolts, and 27c. @ 30c. for Nails, Sheathing and Slatting. Bolt Copper, 40c.

Tin.—The trade in Pig Tin continues in the same dull and apathetic condition as noticed for some time past. Prices, in absence of transactions, are entirely nominal. Stocks are offered a trifle lower than a week ago, and if it were not for the unusually small supplies here they would probably decline much more rapidly. Straits to arrive are offering at 27 1/2 c., and at 28c. on the spot. English L. and F. is obtainable at 28 1/2 c. @ 27c.; English Refined, 27 1/2 c. @ 28c., and Banca, 33c. @ 33 1/2 c. The above quotations are all gold. Latest advices from London quote Straits \$124, and from Singapore, \$32-75 per picul. Tin Plates are in limited demand for small lots, and with only light stock prices are about steady. We quote: Charcoal Tin, \$9-50 @ \$10; Coke Tin, \$7-50 @ \$8; Charcoal Terne, \$9-50 @ \$9-75; and Coke Terne, \$7 @ \$7-75, all gold. The following

table will show the imports during October, stocks on hand November 1, and quantity in transit destined for this market:

	Slabs.	Tons.
Import in October, Straits	4,216	170
English L. & F.	170	60

From the East Indies there are on the way:

	Slabs.	Tons.
Straits	5,883	213
Malacca	6,082	270

Due in all November, December, 1873, and January, 1874.

Stocks in Importers' and speculators' hands:

	Slabs.	Tons.
Straits	7,497	300
English L. & F.	25	10

Total New York and Boston... 7,497 300
Against Nov. 1, 1873... 7,000 305
Nov. 1, 1871... 1,100 34
Nov. 1, 1870... 8,100 316

Lead.—There is very little, if anything, doing in foreign Pig, and prices nominal. Holders are asking about 7c., gold, for ordinary. Domestic Pig is offering at lower prices, and we hear of small sales at 6-10c., gold. We quote: German and Spanish ordinary at 7c.; English, 7c.; foreign refined, 7 1/2 c. @ 7 3/4 c., and domestic, 6c. @ 6 1/2 c., all gold. Manufactured Lead is quiet and unchanged. We quote Bar at 9 1/2 c.; Sheet and Pipe at 10 1/2 c., and Tin Lined Pipe at 16 1/2 c., less 10 per cent. discount to the trade.

Spelter and Zinc.—The market for both foreign and domestic Spelter continues quiet. We quote the former at 7 1/2 c. @ 7 3/4 c., gold, according to brand, and the latter 7 1/2 c. @ 8c., currency. Sheet Zinc is dull, and obtainable from dealers at 8 1/2 c. net, gold, which is lower than agents' figures, viz., 10c., less 4 per cent., gold.

Antimony.—The market for Regulus is quiet and a trifle lower, small sales being reported at 12 1/2 c. @ 13c., gold.

The following is the review of the metal market specially prepared for *The Iron Age* by Messrs. Tros. J. Pope & Bro.:

Trade from consumers is stagnant, and no demand for legitimate trade is noticeable. Manufacturers and commerce are now beginning to feel the full effect of financial revulsion, and but little improvement in the demand for goods can be looked for till spring. In England the high price of money is very sensibly felt in the metal market, and a heavy decline in prices is apprehended.

Pig Iron is nominal; transactions few or none.

COPPER.—Future deliveries, to some extent, have been bought by the parties to the Copper corners of the past two or three years. It is done to make an average with 30c., 28c. and 26c. Copper. But as manufacturers are all heavily supplied, and there can be no improvement in real trade for some months, these movements toward inflation and expansion are looked upon with doubt by the shrewd and judicious. An outside class of speculators may be roped in in past years; but the inevitable contraction in prices, brought always about by panics, points to only one ultimate conclusion to the present movement in Copper.

Tin, dull, neglected and nominal.

ANTIMONY, 13c., gold.

The following are BIGELOW & JOHNSTON'S prices current and remarks, under date of Oct. 31, 1873:

NEW RAILS.—The disintegration of credit has unfortunately made steady progress during October, and it appears as if every branch of industry is being forced into liquidation.

All enterprises connected with railroads are gradually being laid aside, and in consequence the trade in Rails has been limited to one or two retail lots. About 300 tons English, 50 lb. per yard, sold for export to the West Indies at equal to \$60, gold, duty paid, and at this price, when the payment is in prompt cash, more could be obtained. Time offers are nearly invariably refused. We estimate the unsold stock in this port at about 35,000 tons, but the greater portion is not offered at all, or is held for higher figures than any obtainable at present. In American Rails the depression is equally marked, and many of the mills have either shut down or are on short time.

The Manufacture of Spiegeleisen.

Spiegeleisen, a pig metal which breaks into more or less large mirror-like facets, was formerly produced by charcoal out of manganiferous iron ores, its singular peculiarity being due to the presence of 10 to 12 per cent. of manganese, on which the Bessemer process depends for its success. The hot-blast furnaces were of small outlines, but always in splendid working condition. The stacks of the well-known Musen Stahlberg Iron works, and others in that vicinity, were thus built: Total height of furnace, 35 ft.; height of tuyeres above bottom, 1 ft. 3 in.; height of hearth 5 ft.; height of boshes, 9 ft. 5 in.; diameter of tunnel head 3 ft.; diameter of boshes, 9 ft.; diameter of upper part of hearth, 2 ft. 8 in.; diameter of lower part of hearth, 1 ft. 11 in. They were worked with hot blast air at about 300° to 450° Fahr., the air being forced into the furnace through two tuyeres of 2½ to 3 in. diameter, at a pressure of 1½ to 1¾ lbs. per square inch. The average consumption of charcoal per 100 lbs. pig metal was about 118 to 120 lbs.; the average daily production during the year about 4½ tons. In the practical working of the furnace the spathic ores yielded about 38 to 40 per cent. of iron. But on account of the devastation of the forests, and of the scarcity of hard wood suitable for conversion into good charcoal, this fuel, soon after 1859, proved insufficient to produce the spiegeleisen wanted, and it became necessary to replace the charcoal by coke.

In Rhinish Prussia are some large and well conducted iron manufacturing establishments (in the vicinity of Düsseldorf and Duisburg), where, during 1860, the first trials were made of producing spiegeleisen with coke as the fuel. These first trials were a total failure, but by the skill of highly experienced men the problems was at last solved, and there are at the present time some eight or ten large blast-furnaces, each producing daily some 30 tons of this valuable and peculiar pig metal. The iron ores used are of four different kinds—First: Red hematite, a very pure ore from the beds existing on the Lahn, a large tributary of the Rhine, in Nassau. Of this ore there are two varieties, a harder and compact mineral associated with a calcareous gangue, and a softer and pulverulent hematite. Both varieties are entirely free from sulphur and phosphorus, containing from 3 to 4 per cent. of manganese, a small percentage of alumina, water and silica. The presence of carbonate of lime in the body of the compact ore gives it a peculiar character, and renders it eminently fitted for mixing with other silicious ores, there being in the ore 50 per cent. of iron and from 10 to 15 per cent. of carbonate of lime. This ore is very economic in smelting, owing to the presence of lime flux in the most favorable conditions. The pulverulent ore is richer, yielding 55 to 58 per cent. of metallic iron in the practical working of the furnace. Both kinds are easily reduced. Second: The products from decomposition of the specular ore—the German "Braunstein"—of similar favorable constitution, and equally free from obnoxious admixture. It contains some water chemically combined (2FeO, 3H₂O), is porous in structure, yields about 50 to 54 per cent. of iron, and is more easily reduced than any other ore. Third: Excellent spathic iron ore from the vicinity of Musen (Stahlberg), in which a certain proportion of the iron—from 8 to 14 per cent.—is replaced by manganese. All the spathic ores (FeO, CO₂) contain a trace of sulphur, and, therefore, require calcination. The calcination is effected in kilns. By distributing it in alternate layers with waste coal, the ore is rendered porous, and easily broken into small pieces, whereby it is more easily acted upon in the smelting furnace. The chemical constitution of the ore in the crude state is MnO, CO₂, + 4FeO, CO₂=oxide of iron, 49.01; oxide of manganese, 12.43; carbonic acid, 38.56. The oxide of iron represents 37.85 per cent. of metallic iron. By the calcining process the ore is changed into sesquioxide of iron, 81.89 (representing 56.78 metallic iron), and sesquioxide of manganese, 18.11 per cent. Fourth: An aluminous ore used for admixture with the others to make a good-natured ore. These deposits of ore are from 80 to 100 miles distant from the works, and are easily accessible by navigation and by rail. The flux used is a very pure carbonate of lime obtained in the vicinity of the ironworks from the borders of a small creek, the Dussell, the constituents of which are—carbonate of lime, 98.00; silica, 1.50; hygroscopic water, 0.50. As a reducing agent coke is used, the bituminous coals being purified prior to their application to the blast furnaces. The coals are from the vicinity of the ironworks, and the ores are brought thither, for it is always cheaper to bring the iron ores to the coal than the coal to the ores. They contain a good deal of slate, and from 5 to 1 per cent. of sulphur; and to eliminate these noxious adherents they are subjected to a very careful process of grinding (to the size of a hazel nut) and separating by means of water, there being a difference between the specific gravity of pure coal on the one hand and the slate and sulphur on the other—that is, the coal is 1.21 to 1.31; the slate, 2.64 to 2.67; and the sulphur, 1.96 to 2.05. Having been subjected to this process the coals are coked in closed furnaces, the charge of each furnace consisting of 120 scheffel (bushels) covering the bottom of the furnace to a height of 18 or 20 inches. The coking process lasts 36 hours, and furnishes from 57 to 60 per cent. of coke by weight of porous cellular character sufficiently firm to hold up the burden of the furnace, and containing 8 to 10 per cent. of ashes of a reddish white or gray color. The volatile carbonic matter of the coals, after having been used to heat the partitions and floors of the coking furnaces, are sufficient to heat the steam boilers. The air-blast is supplied by two 80 horse horizontal engines, manufactured by the Serravallo Works, maintaining four blast furnaces and one vertical 100 horse engine for fifth furnace and for reserve. The blast is regulated by being passed through a reservoir 200 ft. long and 6 ft. diameter—4654 cubic feet. The principal dimensions of the horizontal engines are—diameter steam-cylinder, 3 ft. 3 in.; diameter blast-air cylinder, 7 ft. 6 in.; length of steam cylinder, 3 ft. 3 in.; length of cylinder, 7 ft. 9 in.; diameter of blast air cylinder, 8 ft. By 13 revolutions per minute there will be 18,000 cubic feet of air, less 10 per cent. for leakage. The vertical engine has—diameter of steam cylinder, 3 ft. 3 in.; length of cylinder, 7 ft. 9 in.; diameter of blast air cylinder, 8 ft. By 13 revolutions per minute there will be 18,000 cubic feet of air, less 10 per cent. for leakage. Before being forced into the furnace the blast air is heated by means of the gases escaping from the mouth of the furnace, and collected there by means of a special apparatus. It is found that two heating apparatuses are sufficient to heat the blast air of each furnace. There are 32 pipes in each apparatus of the shape represented, each pipe being divided, as will be seen, by means of a partition into two parts, so that the blast air may ascend and descend in each pipe. The latter are each from 10 ft. to 12 ft. long; the surface exposed to the fire is 2420 square feet, and the cubic contents of the 32 pipes is 460 cubic feet. The dimensions of the blast furnaces, there being two groups of stacks, are:

Diameter of hearth (upper end).....	4	6	8	11½
Diameter of hearth (lower end).....	4	6	8	10
Height of hearth.....	6	8	7	9½
Height of boshes.....	11	9	10	3¾
Height of center of tuyeres above bottom.....	2	5	2	5
Inclination of the boshes 50°.....				
Square contents of the mouth.....	56	0	78	0
Square contents of the boshes.....	130	0	183	0
Cubic contents of the whole furnace.....	6396	0	5910	0

The bottom and lower parts of the hearth up to 3 ft. above the tuyeres are built with puddling-stone from Marchin, in the Ardennes, Belgium; and for the upper hearth, boshes and tunnel of the furnace Ardennes fire clay bricks are used. It must be remembered—for this was what caused so much trouble and meditation to the iron masters—that spiegeleisen is chemically composed of four parts iron with one part carbon (Fe₄C), and that the combination is only formed during the period of the smelting process which follows immediately after deoxidation of the iron ores. To fulfill the conditions under which this combination of iron and carbonic matter can take place, it is absolutely necessary that the mixture of ores and flux be of the most fusible nature, so as to allow of the accumulation of the charge—in proportion to a fixed amount of coke—to such a degree that the smelting and separation of the iron from the slag occurs at a point as near as possible to the tuyeres. It is safe to say that this separation, when resulting at a higher place in the hearth, would give too great an opportunity for the carbonic matter to carry off some of the carbon from the iron, changing itself into carbonic oxide, and reducing at the same time the constitution of the spiegeleisen (Fe₄C) to a lower grade of carbonization. The temperature at which the specular iron melts is calculated=3583° Fahr. It is, therefore, found necessary that the charges should be composed of red hematite, 30 per cent.; spathic ore, 38 per cent.; decomposed brown ore, 20 per cent.; and aluminous ore, 12 per cent., yielding 40 to 50 per cent. metallic iron in the practical working of the blast furnace, and to create the needed fusible slag there was added from 32 to 40 per cent. of lime. Each charge consisted of 1860 lbs. coke, 2900 to 3200 lbs. of mixed ore, and 800 to 900 lbs. of carbonate of lime. The furnace carries 35 to 40 charges in the 24 hours, and yields an average of 60,000 lbs., or 30 tons a day. For 1 ton of pig metal there was used 2 tons of iron ores, nearly 13 cwt. of fluxing materials, and 1½ tons of coke. The blast air, with a temperature of 650° to 660° Fahr., is forced into the furnace at a pressure of 2½ to 3 lbs. per square inch at the engine, and of 2 to 2½ at the tuyeres. Out of the five tuyeres two are on opposite sides, and one at the rear of the furnace, each one declined a few degrees from the center of the hearth, so as to force the blast air into a kind of whirlwind, which is considered the best way of distributing the compressed air through the smelting and combustible mass.

Owing to the high temperature in the hearth the tuyeres, and even the mass of stone forming the hearth, would not endure for any length of time, but for being provided with a circulation of water. The signs of a good working condition of the blast furnace are—the slag is nearly stony, showing a superabundance of lime, only the edge being somewhat glassy; the color of the interior stony part is a light green, or greenish yellow, covered on the outside with a thin brown coat; the slag flows steadily and easily over the sandstone, even to a considerable distance, proving thereby not only its own fluidity and warmth, but also the existence of the desired and necessary heat in the hearth of the furnace. The furnace is tapped every eight hours, and the forepart of the hearth, as far as the tuyeres, is cleaned once during the time. The tuyeres are always clean and bright, and very seldom require a mechanical cleaning. The flame escaping from the tunnel head of the furnace is without any smoke, not very hot, and of a bluish color, a hot red flame indicating a change in the working of the furnace. If the mouth of the furnace be closed by means of an apparatus for utilizing the gases to heat the blast air they never show a temperature greater than between 140° and 170° Fahr. The metallic iron runs into large channels formed in sand, which are covered as soon as possible with a layer of dry sand, to retard its cooling, thereby producing facets of a larger and brighter form, sometimes as large as the palm of the hand. The cold pig metal is very brittle and sonorous; the surface of the casts are concave, the fracture representing the silvery facets and its mean specific gravity of 1500° Fahr.

If the slag be too infusible, there will not be heat enough in the furnace to produce Fe₄C, or even to reduce the ores. The signs of a coming disaster like this are indicated by a slag which bears a glassy appearance throughout the whole mass. This crude slag, at first very fusible, cools very quickly, and after a few hours, flows very slowly and thickly over the damstone, the tuyeres become darker, and the flame at the tunnel head is very red and hot. The best remedy in such a case is less blast air, a few charges of coke only, and smaller charges of ore. If the mixture of flux and ore be too fusible, then the ores will melt before they are entirely reduced; the slag cannot protect the iron from combustion in the vicinity of the tuyeres, and it will, therefore, be reduced to FeO, which renders a dark black slag. The tuyeres will be clear, but not clean, requiring frequent mechanical cleaning. The forming of a mass of unreduced ores and slag takes place in the center of the furnace, which one cannot see on account of the bridge tuyeres, but which can be easily observed by means of an iron bar thrust into the furnace through the openings in the tuyeres. The first indications of such a crude working state of the furnace are found in a quicker irregular going down of the charges at the mouth of the furnace, and in this case the remedy is less blast air, but at a higher pressure, forcing the charges to go down more slowly until there is found opportunity to change the mixture of fluxing materials. The constitution of the mixture, where it is not fusible enough, produces a black slag, indicating that the same takes up iron in the vicinity of the tuyeres, hindering its reaction, the heat decreases in the furnace. The best remedy for this state of affairs is more blast air, with the same width of nose pipes, less ore and flux.

The first development of spiegeleisen manufacturing, by means of coke, was attended by many difficulties, which at times seemed insurmountable, and when at last it was definitely known that the science of metallurgy had overcome the greatest obstacles, there still remained in the minds of iron masters an aversion to the new metal. The iron had to be introduced into the markets and its merits made known, and iron masters reluctant to experiment with a material of such different quality from that which they had been accustomed to use, required very great inducement to try it. The first thing was to test its value and bring it to the favorable notice of the iron masters; experiments were made, and proved that its freedom from sulphur and phosphorus on the one hand, and the presence of manganese on the other, produced a metal unequalled in value by any known to commerce, except the small quantity produced by means of charcoal. Quantities of the new iron were soon introduced into the rolling mills and other works, and the unanimous verdict of all who tried it was to the effect that it was preferable to the best iron previously known, and the only kind that would enable Bessemer steel manufacturers successfully to carry out that process. Ever since that time the demand has exceeded the supply.

GLASS CUTTERS.

Our Glass Cutters are made with a handle like a Glaziers' Diamond, but instead of the diamond point they have a small hardened steel revolving wheel, the sharp edge of which cuts nearly as well as a diamond. They are durable and will give entire satisfaction. Most Hardware Dealers keep them, or will send to us for them if wanted. Where they are not for sale, we will send one by mail, prepaid, on receipt of thirty-five cents. We will send one to any publisher who will insert this notice and forward us a copy prepaid.

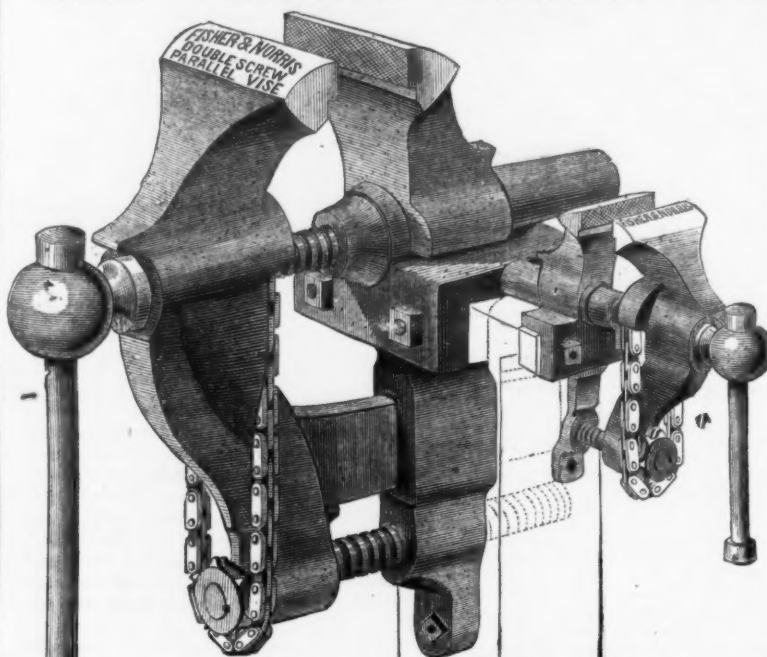
MILLERS FALLS CO.,

78 Beekman Street, New York.

Also Manufacture Barber's Bit Braces, Parallel Vises & Drilling Machines.

CHARLES CHURCHILL & CO., European Agents, 28 Wilson St., Finsbury, London, E. C.

THE DOUBLE SCREW PARALLEL VISE.



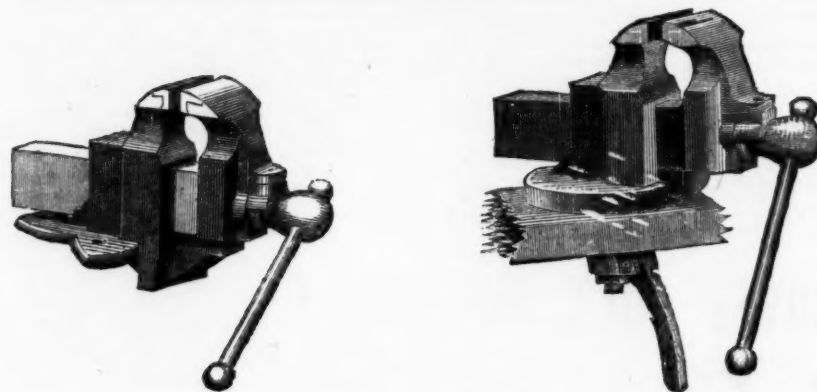
More than twenty-five years' use of this Vise by Machinists, Tool Makers, Locomotive Shops, &c., has established its superiority over every other. It is the only one which has all the strength and "grip" of the ordinary English Vise; and at the same time with the jaws parallel at every point of opening. In all other "Parallel" Vises using only one screw, less than one-third of the power applied is effective on the work itself; beside, in those vises the large waste of power on the slide from friction and the tendency to "jam," of the lower end of the jaw, if screwed up very hard, renders them unfit for heavy work. In this vise the jaws are kept *always* parallel by the lower screw moving in or out exactly with the upper, lever screw, by means of the chain connecting both; also, by their relative position two-thirds of the power applied at the lever screw is received by any piece held between the jaws—thus enabling the heaviest work ever required of a vise to be done with this. The Screws are forged of the best refined iron, and work in solid cut thread boxes. The Jaws are faced with best Tool Steel, welded on, file cut, and properly tempered for wear. The Chain is very carefully made of case hardened inside links and rivets, and acting only to regulate the position of the lower screw for different points of opening, has no direct strain of the work upon it; it is therefore as durable as the other parts. Only the strongest material is used in this manufacture and from actual experiment on the six inch jaw vise which has screws of 1½ inch diameter and lever 19 inches long, it has been found that applied at the lever screw, it required to break either of the jaws, *down and out-half* tons, thus exhibiting a maximum strength far above any other vise of like size.

PRICES. (Usual discount made to the Trade.)
No. 1. Width of Jaw 3 inches, and weighing about 12 lbs., \$5.00 | No. 3. Width of Jaw 5 inches, and weighing about 83 lbs., \$15.00
No. 2. Width of Jaw 4½ inches, and weighing about 50 lbs., 14.00 | No. 4. Width of Jaw 6 inches, and weighing about 123 lbs., 24.00
No. 5. Width of Jaw 7 inches, and weighing about 160 lbs., \$30.00.
THESE GOODS ARE SOLD BY OUR AGENTS IN:
NEW YORK.—Messrs. Clark, Wilson & Co. Russell & Erwin Manufacturing Company. Messrs. Durrie & Risher.
BOSTON.—Messrs. George H. Gray & Danforth. PHILADELPHIA.—Messrs. James C. Hand & Co. BALTIMORE.—Mr. W. H. Cole.

FISHER & NORRIS, Trenton, N. J.,

Sole Manufacturers of these Vises, and of the "Eagle" Anvils.

HOWARD PARALLEL BENCH VISE.



Manufactured at the

HOWARD IRON WORKS,

Buffalo, N. Y.

RUSSELL & ERWIN MANUFACTURING CO.,

New York and Philadelphia, Agents.

MINOT & CO., Oliver Street, Boston,

Selling Agents Lowell Wrench Co.'s

TRIPLE ACTING RATCHET DRILL, the Simplest, Cheapest and Best.

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HAMMERS,
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MEDAL OF MERIT
THE BEST COAL COOKING STOVE IN THE WORLD.
ELEVEN ENTIRELY NEW SIZES.

W.M. RESOR & CO., Cincinnati.

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STAMPED CORRUGATED RIVETED BOTTOM IN SIX STYLES.

SMITH, BURNS & CO.,

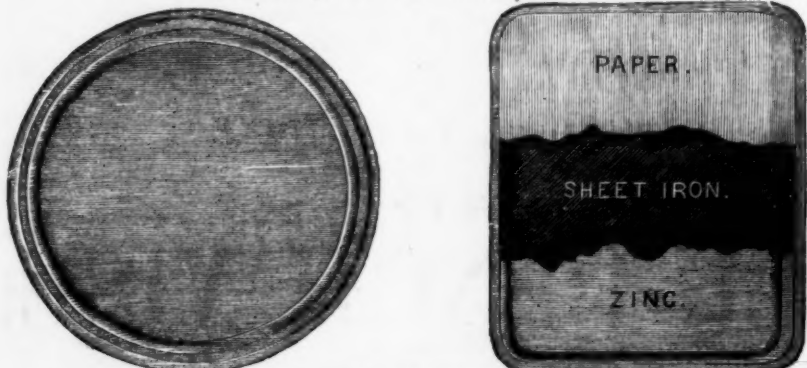
Manufacturers of

Galvanized and Japanned Sheet Iron Goods and Tin Ware, Fry Pans, Broilers, Ash Cans, Garbage Buckets, Chamber Pails, Tea Kettles, Wash Boilers, Water Pails, Well Buckets, Toilet Ware, &c., &c. Exclusive manufacturers of the Patent Combined Chamber and Commode Pail. Stamped and Finished Ware.

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A HOME COMFORT. Brooks' Patent Stove Board.

Letters Patent from the United States and Canada.



This really genuine improvement in Stove Boards is illustrated by the cuts; the round one being a top view of the zinc surface, polished and neatly beaded around the edge, and the oblong one shows the under side, with paper, and between that and the zinc a layer of sheet iron, which effectually protects it from being marred by the stove legs, or other use; and also stiffens it to lay very flat, and is a necessity to support the ornamentation.

The parts are held together by turning the edge of the zinc like a hem around the under side. They are equally desirable for Parlor or Cooking stoves, are as cheap as plain zinc, when their durability is considered, and are the most appropriate article in market for their purpose.

21 Sizes, Round, Square and Oblong. Prices and Circulars supplied upon application. Address the manufacturer.

SIDNEY SHEPARD & CO., Buffalo, N. Y.

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IMPROVED BOLT MACHINERY.

BOLT HEADER,

That will head 10,000 per day.

Single & Double Head BOLT CUTTERS,

That will cut from 5,000 to 10,000 per day.

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THE Chapin Machine Co.,
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SOLID BOX VISES.

With or without Convex and Concave Washers.

Jackscrews, Braces, Coffin Mills, Turning Lathes, Clamp Heads and Screws, Parallel Bench Vises, Sash Pullies, Hot House Pullies, Composition Cocks, Bench Screws, Vise Screws, Gridirons, Drill Stocks and Boxes, Box Chisels, Rivets, Sheaves, Block Pins, Composition Roller and Iron Bushings, Biggers' Screws, Caulkers' Tools, Pump Chambers, Belaying Pins, Marlin Spikes, Malleable Iron Castings, and General Hardware.

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UNITED NICKEL CO. OF NEW YORK

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 42 Mechanic St., NEWARK, N. J.

A. G. COES
 PAT. DEC. 26, 1871.

Established in 1833.

A. G. COES & CO.

WORCESTER,

Mass.,

Manufacturers of

THE GENUINE

COES'

SCREW WRENCHES.

Our goods have been very much improved recently, by making the Bar WRENCH, as shown in the cut, which makes a 12 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

A. G. COES'

NEW PATENT

FERRULE

Which cannot be forced back into the handle.

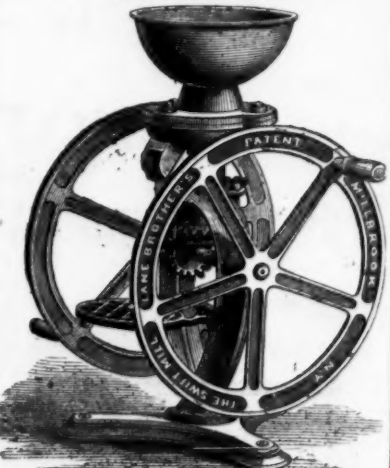
Our goods are manufactured under Patents dated February 7, 1860, (re-issued June 9, 1871), May 2, 1871, and Dec. 31, 1871, and any violation of either will be rigorously prosecuted.

We call particular attention to our new Patent Ferrule, with its Supporting Nut (shown in section in the above cut), which makes the strongest Ferrule fastening known.

A. G. COES & CO.

The Swift Mill.

Established in 1845.



Letter "B" Geared Counter Coffee or Spice Mill.

Stands nearly 3 1/2 feet high. Is highly finished, colored deep Vermilion and Gold. We make more than 30 different styles and sizes. Manufactured exclusively by
LANE BROTHERS, Millbrook, N. Y.

TORREY'S PATENT WEATHER STRIPS.

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MANUFACTURER OF

Japanned, Plain and Stamped Tin Ware,
TOILET WARE a specialty,

Manufactured of XXX Tin and Ornamented in Varied and Elegant Designs



SOLE MANUFACTURER OF THE PATENT

Self-Righting Cuspadore,

With Cast Iron Bottom, and

FOOTE'S PATENT LOCK UMBRELLA STAND.

THE CORRUGATED STOVE PIPE ELBOW,
Strong, Durable.
Cheap.
No Soot, Better Draft.



MANUFACTURED BY

SELLEW ELBOW CO.,

48 Cliff Street, NEW YORK.

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Full Size.

SARGENT & GREENLEAF'S

Celebrated

UNPICKABLE LOCKS.

Drawer, Trunk,
HOUSE AND STORE DOOR LOCKS

PAD LOCKS,

Night Latches, Etc.,

WITH FLAT GERMAN SILVER KEYS.

Combination Bank and Safe Locks

Also the

Patent Adjustable Elbow.



For Stove, Furnace, Conductor, and all other Sheet Metal Pipes, With Universal Adjustable Joints.

Can be changed at will to any desired angle. Its advantages over all other Elbows are at once apparent. For Beauty, Strength and Durability it is Unequaled.

Manufactured by

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 P. O. No. 4498,
 300 Broadway, N. Y.

Send for Catalogue and Price Lists.

New York Wholesale Prices, November 12, 1873.

HARDWARE.

[illegible]

Superior, Philadelphia	dis 40 5 10
Star, Superior Philadelphia	dis 35 5 5
Conk Shovels.	
Iron Handled	per doz, \$ 55 @ 1 25
Wood Handled	per doz, 1 00 @ 1 00
Coal Hods.	
Smith, Burns & Co.	dis 25 5 1
Japaned, No. 14	15 18 17 18
Galvanized	15 00 16 00 17 00 18 00 19 00 22 00
Common Japaned, No. 14	15 16 17 18
Galvanized	15 00 16 00 17 00 18 00 19 00 22 00
Common Japaned	dis 30 10 5
Galvanized	dis 30 10 5
Cock.	
Brass Backing	dis 20 10 5
Lock and Grobe	dis 20 10 5
Coffee Mills.	
Increase Wilson's	dis 15 5
Selzer's Pat.	new list dis 10 5
Robber Patent	\$9 50, \$10 50—dis 30 5
"Champion"	dis 30 5
Swift's	dis 30 5
Compasses and Dividers.	
Excelsior	dis 15 5
Perk Stead & Wilcox	dis 25 5
Coopers' Tools.	
Bradley	dis 15 @ 20 5
Corn Knives and Cutters.	
Bradley's	list
Gaulter & Co.	per No. 5 10 5
Curry Combs.	
Mitchell and Kellogg's, Iron and Brass	dis 15 10 5
Fitch's	dis 15 10 5
Ruggles	dis 15 10 5
Robber Patent	dis 15 10 5
Schweitzer Mfg. Co.	per doz, \$ 20 5
Curtain Pins.	
Silvered Glass	dis 40 10 5
Cutters.	
American Table	dis 15 5
Door Springs.	
Gray's	\$7 50 per doz—dis 40 10 5
Palmer's Japaned No. 4	per doz \$5 00
"Coppered	dis 40 10 5
"Screw	dis 40 10 5
Challenge.	
Japaned	per doz \$4 00 @ 6 00
Nickel Plated	per doz 6 50 @ 9 00
1 Gross lots	dis 10 5
Drawing Knives	dis 10 5
Drills.	dis 25 5
Ingersoll's Hatchets	dis 25 5
Brooklyn Acting Hatchet	dis 25 5
Keg Heaters.	
Mourice's	per doz net \$8 25 @ \$9 50
Barle's Patent	per doz net \$25 00 @ \$26 50
Pratt's Aerialing	dis 10 5
Emery.	dis 10 5
Genuine Chester—Regular Nos.	per doz 5 @ 10 5
Washington Mills—Regular Nos.	per doz 5 @ 10 5
Enamelled and Tinned Ware.	
Kettles	per doz 10 5
Sauce Pans, Glue Pots, &c.	dis 10 5
Faucets.	
Cork Lined Wood	dis 10 5
Fenn's	dis 10 5
Star	dis 10 5
Frapp's Patent Petroleum	dis 10 10 5
Taylor's Patent	dis 20 10 5
Wood and Metallic Files.	
Nicholson	\$5 00 to 2 currency
J. & J. Miller Carr's	50 10 5 to gold
Stahl's	50 10 5 to gold
Butchers	50 10 5 to gold
Spear & Jackson's	50 10 5 to gold
Roberts, Smith & Co.	50 10 5 to gold
Jewitt's	50 10 5 to gold
Western	50 10 5 to gold
R. Ibbotson	50 10 5 to gold
Beam & Murray, "Cyropa"	40 10 5 to gold
Goodall's	40 10 5 to gold
Moss & Gamble	50 10 5 to gold
Acme's	\$7 00 each net
Cole	6 75 each net
Knox, with 4-inch Rolls	7 00 each net
O. K.	6 00 each net
Series, 4-inch Rolls	6 00 each net
Excelsior, No. 1	5 00 each net
Diamond	4 75 each net
Claxton's "Diamond"	5 00 each net
Empire	7 50 each net
Emika, "Diamond"	5 00 each net
"No. 2, 5-inch Roll.	8 00 each net
E. F. M.'s 4-inch Roll	6 50 each net
Convex Brass Fluter, Sad Iron attachments	\$1 75
Dorsey, Self-Heater	\$1 75 each net
National, 5-inch Rolls	5 00 each net
Pontion Fluter, Bright	\$1 50—dis 25 5
Galvanized	\$1 50—dis 25 5
Greasy Hand Fluter.	\$1 25 each net
Fry Pans.	
Thinning	dis 10 5
per doz., \$350 5 25 5 50 4 50 4 50 5 00 7 50	
No. doz. 1 2 3 4 5 6 7 8	
Smith, Burns & Co., "Excelsior" Polished	dis 20 5
per doz.	\$2 50 4 00 4 75 5 00 6 00 7 00 8 00 9 00
Hammers.	
Ennet Hammer Co.	dis 10 5
Mitchell's Hammer	dis 10 5
Cheney's	new list net
Verre	dis 15 5
Minot & Co.	dis 10 5
Handles.	
Hammer and Hatchet	dis 10 5
Quacktown, Axe, Pick and Sledge	dis 10 5
Hammer and Hatchet	dis 10 5
Greenboro', Hammer, Sledge, Pick	dis 10 5
Woolworth Axe, Pick and Sledge	dis 10 5
Harness Snaps.	
Johnson	dis 10 5
Fitch's	dis 30 5
Hatchets.	
Shingling, Nos. 123	per doz \$7 50 8 00 8 50
Claw	per doz \$8 50 9 00 9 50
Lathing	per doz \$7 50 8 00 8 50
Hunt's	per doz \$7 25 8 00 8 75
Shingling, Nos. 123	per doz \$7 25 8 00 8 75
Claw	per doz \$7 50 8 00 8 50
Lathing	per doz \$7 50 8 00 8 50
Hard's	per doz \$8 00 8 50 9 00
Claw	per doz \$8 00 8 50 9 00
Lathing	per doz \$8 00 8 50 9 00
Shingling, Nos. 123	per doz \$6 50 7 00 7 50
Claw	per doz \$7 25 7 75 8 25
Lathing	per doz \$7 25 7 75 8 25
Yerks & Plumb	per doz \$7 00 7 50 8 00
Shingling, Nos. 123	per doz \$7 00 7 50 8 00
Claw	per doz \$7 00 7 50 8 00
Lathing	per doz \$7 00 7 50 8 00</

How Hooped and Eyes, revised list.										dis 663-10									
Horse Nails.																			
Putnam's.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
In lots 200 lbs. dis 5 %.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
In lots of 1000 lbs. 5 % discount.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
In lots of 500 lbs. dis 5 %.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
American Pressed.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
In lots of 1000 lbs. dis 5 %.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
Perkins Finished (ready to drive).																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
In lots of 1000 lbs. dis 5 %.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
Buffalo Forged.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
Globe (Pointed and Polished).																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
In lots of 1000 lbs. 5 % discount.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
National (Pointed and Polished), Extra Finish.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
In lots of 1000 lbs. dis 5 %.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
Vulcan (Blind, pointed, ready to drive).																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
In lots of 500 lbs. 5 % discount.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
New London Horse Nails.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
Great Britain.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
U. S.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
In lots of 1000 lbs. dis 5 %.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
Star Brand.																			
No.	5	25c	28c	30c	32c	34c	36c	38c	40c	42c	44c	46c	48c	50c	52c	54c	56c	58c	60c
Morgan.																			
Horse Shoes.																			
Burdett																			
Shoemaker																			
I. H. Horse Shoe Co., Perkins Pattern																			
R. I. Pattern																			
Male Shoes																			
Knives.																			
Enameled																			
Brass																			
In lots 200 lbs. 5 % discount																			
Knives.																			
Ames' Butcher Knives																			
Yale & Towne																			
Hay and Straw																			
Knobs																			
Base-Common																			
Elastic End																			
Trenton Lock Co.																			
Brady's Patent																			
Adair																			
De Beque																			
Locks and Latches.																			
Cabinet-Gaylord																			
Trunk																			
Shepardson's																			
Trenton Lock Co.																			
Norwich																			
Ment Cutters.																			
Doyle & Co.																			
Each																			
Hawthorn																			
No. 1																			
Perry & Co.																			
No. 2																			
W. & J. W.																			
Adair																			
Each																			
Staples.																			
Stapling Pattern																			
Tinned ends																			
Wells' Patent																			
Patent Self-Measuring																			
House Traps.																			
Wire Choker																			
Nails																			
100 Cut (Standard)																			
Nuts and Washers																			
Nuts																			
Washers																			
Oil.																			
Hindst No. 1																			
Slips																			
Slips																			
Others.																			
Washoe R. R. Nos.																			
Washoe R. R.																			
Picture Nails and Knobs																			
Richards' Patent																			
Barnes																			
Sanitary Tool Co., 1st quality																			
Ohio Tool Co., 1st quality																			
Owaco Tool Co., 1st quality																			
Plane Irons																			
Butcher's																			
Spear & Jackson's																			
Sanitary Tool Co.																			
Plumb and Level																			
Standard Rule Co.'s New Adjustable																			
Pumps.																			
Douglas																			
S. & F.																			
Rakes.																			
Cast Steel																			
Razor Straps																			
Genuine Esters																			
In 5 gross lots																			
Chambers																			
Rivers.																			
Iron and Tinned																			
Concrete and Burns																			
Rods.																			
Steel																			
American Patent																			
Rope.																			
Manila																			
Lath 3/4 in.																			
1/2 and 5/8 inch																			
Sisal																			
1/2 inch and larger																			
Hay Rope																			
Rules.																			
Staley & Curtis Mfg. Co.																			
Stanley Rule and Level Co.'s Ivory																			
Boxwood																			
Standard Rule Co.'s Boxwood																			
Ivory																			
Saw Irons.																			
Saw Iron, Nickel Stand attached																			
Saw Paper-dis 1/2 % to 1 %																			
Baker & Adamson's 2 1/2 % to 3 %																			
Assorted																			
Emerald																			
Cowdin Mfg. Co.																			
Diamond Flat																			
Emergency Paper																			
Sash Lucks.																			
Clark's																			
Ferguson's																			
Champion																			
Sash Weights.																			
Solid Eyes																			
Perry's (P. S. & W.)																			
Saw Rods.																			
Spear & Jackson's																			
John Spear																			
Perforated Cross Cuts, all kinds																			
Inserted Tooth																			
Distort																			
H. F. Reed Circulars																			
Other kinds																			
Wm. McNeice's Hand, Cross Cut and Cir- cular																			
F. M. Norton's																			
Others																			
Scales.																			
Brown's																			
Fairbanks																			
Howe's																			
National Platform																			
Europa																			
No. 1																			
No. 2																			
Screws.																			
American Flat Head of April 1, 1873																			
Flat Head Iron																			

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The Iron Age Directory

and Index to Advertisements.

AGRICULTURAL STEELS AND IRONS, etc., Makers of.	PAGE
Nellis, A. J. & Co., Pittsburgh, Pa.	106
ANVILS, Manufacturers of.	
Fisher & Norris, Trenton, N. J.	102
ANGLERS.	
Elmira Nobles Mfg. Co., Elmira, N. Y.	106
ANGLERS, BITS, etc., Manufacturers of.	
Shattuck W. F. & Co., 18 Chambers, N. Y.	106
AXLES, Springs, etc., Manufacturers of.	
Clark, Smith & Co., Fort Plain, N. Y.	112
Hutchins Guy C. & Field, Brooklyn, E. D.	112
Westworth H. M. & Co., Gardiner, Me.	112
BAND SAW MACHINES, Makers of.	
Richards, Loudon & Kelley, Phila.	102
BAND SAWS AND TOOLS FOR BRAZING &c., Importers of.	
Guenther, George, 39 W. 4th, N. Y.	110
BELLHOPS, Manufacturers of.	
Churchyard, Joseph, Buffalo, N. Y.	106
Newcomb & Sons, 528 Water, N. Y.	106
BELLING, LATHES, Makers of.	
Alexander Bros., 412 N. 3d, Phila.	106
Bradford & Sharp, Cincinnati, O.	106
BELT PUNCHES, Manufacturers of.	
The Lowell Wrench Co., Worcester, Mass.	106
Kellogg E. C. & Co., Hartford, Conn.	106
BIRD CAGES, Makers of.	
Lindeman A. & Co., 24 Pearl, N. Y.	114
Maxwell, J. M., 24 Pearl, N. Y.	114
BIRCHES, Manufacturers of.	
Miller's Falls Mfg. Co., 75 Beekman, N. Y.	102
BOILERS—STEAM.	
Verter Thos. 30th and Chestnut, Phila.	106
BOILER HEADS, Makers of.	
Chapin Machine Co., New Hartford, Conn.	102
Piano, Burdett & Barnard, Buffalo, N. Y.	106
BRASS, Manufacturers of.	
Ansonia Brass and Copper Co., 19 Cliff, N. Y.	102
Benjamin & Barnum Mfg. Co., Waterbury, Conn.	102
Co. Brass Mfg. Co., Waterbury, Conn.	102
Pittman & Atwood Mfg. Co., 40 Chambers, N. Y.	102
Seawall Mfg. Co., 4 Beekman, N. Y.	102
Waterbury Brass Co., 52 Beekman, N. Y.	102
BRICK PRESSES, Makers of.	
Carroll Geo., 1819 Germantown Ave., Phila.	102
Carroll T. L. & D. H., 1819 Germantown Ave., Phila.	102
BRIDGE BUILDERS.	
Moseley Iron Bridge and Roof Co., 5 Dey, N. Y.	106
BUTCHER AND SHOE KNIVES, Manufacturers of.	
Wilson John, Sheffield, England.	102
BUTTS AND HINGES, Makers of.	
American Butt Co., Providence, R. I.	106
American Spring Butt Co., 21 Park Row, N. Y.	106
Atina Nut Co., 108 Mulberry, N. Y.	106
Crowe & Co., 108 Mulberry, N. Y.	106
Ohio Butt Co., 97 Chambers, N. Y.	106
Roy & Co., West Troy, N. Y.	106
Union Mfg. Co., 55 Chambers, N. Y.	106
CABINET HARDWARE, Manufacturers of.	
Landers, Fry & Co., 226 Broadway, N. Y.	102
CARRIAGE BOLTS, Makers of.	
Skelly T., 41th below Callowhill, Phila.	102
Townsend, William & Hubbard, Phila.	102
CARRIAGE HARDWARE, Makers of.	
Smith B. D. & Co., Plainville, Conn.	102
CAR WHEELS, etc., Manufacturers of.	
Jackson & Woodin Mfg. Co., Berwick, Pa.	106
Taylor Iron Works, High Bridge, N. Y.	106
CHAINS, Makers of.	
Cole, Gordon & Co., 1815 Richmond, Phila.	106
Kendrick & Rankle, Trenton, N. J.	106
Wyatt Thos., 71 Eddy, Providence, R. I.	106
CHAINS, Manufacturers of.	
Black Bros., Millbury, Mass.	106
CLOTHES WRINGERS, Manufacturers of.	
Moore S. H. & E., 66 Lake, Chicago, Ill.	106
Providence Tool Co., 11 Warren, N. Y.	106
COAL MINERS.	
Farde A. & Co., 111 Broadway, N. Y.	106
COAL HOODS, Manufacturers of.	
Eastbrook Wm., 811 Cherry, Phila.	106
Ohio Coal Hood Co., 487 E. 1st, Phila.	106
Smith Burns & Co., 45 Cliff, N. Y.	106
COFFEE AND SPICE MILLS.	
Lane Brothers, Millbrook, N. Y.	106
Enterprise Mfg. Co., Philadelphia, Pa.	106
COFFIN TRIMMINGS, Makers of.	
Wayne Hardware Co., Cincinnati, O.	106
COMMISSION MERCHANTS, English.	
Goddard Samuel A. & Co., Birmingham, Eng.	106
COMPASSES AND DIVIDERS, Manufacturers of.	
Bemis & Call Hard, & Co., Springfield, Mass.	106
COPPER'S TOOLS, etc., Dealers in.	
Littler Chas. E., 59 Fulton, N. Y.	106
CORRUGATED STEEL PIPE RIBBONS, Makers of.	
Corrugated Metal Co., East Berlin, Conn.	106
Sellw Elbow Co., N. Y. and Chicago.	106
CRUCIBLES, Manufacturers of.	
Newkumet Adam, 1871 N. Front, Phila.	106
Rose, Stow & Huffercamp, 188 N. 6th, Phila.	106
Taylor, Stow & Co., Phila.	106
CURRY COMBS, Manufacturers of.	
Mellogg W. F. & Co., Troy, N. Y.	106
UTILITY, Importers of.	
Baker Hermann & Co., 101 Duane, N. Y.	106
Dickinson Henry, 66 and 68 Reade, N. Y.	106
Fisher John, 411 Commerce, Phila.	106
Friedman & Leister, 14 Warren, N. Y.	106
King H. J., 101 Duane, N. Y.	106
Shattuck W. F. & Co., 18 Chambers, N. Y.	106
Ward Asstn, 101 Duane, N. Y.	106
Wilson Hawksworth, 1111 and 100 John, N. Y.	106
Smith & Hall, 50 and 52 Reade, N. Y.	106
Taylor Thomas & Chambers, N. Y.	106
CUTLERY, Manufacturers of.	
American Knife Co., Thomaston, Conn.	106
Burkhead Aaron, Poughkeepsie, Mass.	106
Landers, Fry & Co., 226 Broadway, N. Y.	106
Miller Bros. Cutlery Co., W. Meriden, Conn.	106
New York Knife Co., W. Meriden, Conn.	106
U. S. Steel Shear Co., W. Meriden, Conn.	106
DIFFERENTIAL PULLEY BLOCKS, Makers of.	
Van Wart & McCoy, 43 Chambers, N. Y.	106
DOG COLLARS.	
Conner T. & J., 29 Duane, N. Y.	106
DOOR AND GATE SPRINGS.	
The Challenge Door Spring Co., 40 Ann, N. Y.	106
Palmer & Gray, 22 Elm, Cincinnati, O.	106
Van Wagner & Williams, 27 Park Row, N. Y.	106
DREDGING, and Makers of Dredging Machines.	
Am. Dredging Co., 214 S. Delaware ave., Phila.	106
DRILL CHUCKS, Manufacturers of.	
Cushman A. F., Hartford, Conn.	106
Humbert & Curtis Mfg. Co., 82 Chambers, N. Y.	106
Hill F. A. & Co., Danbury, Conn.	106
DRILLING MACHINES, Makers of.	
Miller Falls Mfg. Co., 75 Beekman, N. Y.	106
Thorne & DeHalla, Philadelphia.	106
DYNAMOMETERS.	
Prosser Thomas & Son, 12 Gold, N. Y.	106
EDGE TOOLS, Makers of.	
Bradley G. W., 37 Chambers, N. Y.	106
ELEVATORS, Makers of.	
Lane & Bodley, Cincinnati, O.	106
Otis Bros. & Co., 348 Broadway, N. Y.	106
EMERY.	
The Union Stone Co., 16 Exchange, Boston.	106
EMERY CLOTH.	
The Union Stone Co., 16 Exchange, Boston.	106
EMERY WHEELS, Makers of.	
The Union Stone Co., 16 Exchange, Boston.	106
ENGINEERS, MACHINISTS, etc.	
Reusch James, 105 Beach, Phila.	106
James Moore, cor. 15th and Buttonwood, Phila.	106
Tavis & Hartman, 125 N. Front, Phila.	106
ENGINEERS, STEAM, Makers of.	
Fitchell Landing Mch. Co., Fishkill-on-the-Hudson, N. Y.	106
New York Steam Engine Co., 36 Chambers, N. Y.	106
Paulding, Kemble & Co., 30 Broadway, N. Y.	106
Whitehill, Smith & Co., Newburgh, N. Y.	106
ENGRAVERS, Wood.	
Batterson Jas. S., 21 Spruce, N. Y.	106
Roberts Wm., 36 Beekman, N. Y.	106
EYEGLASSES.	
Valton Eyelet Co., Providence, R. I.	106
FACETS, Self-Measuring, Makers of.	
Enterprise Mfg. Co., of Pa., Phila. and N. Y.	106
FILES, Importers of.	
J. J. & Riley, 21 John, N. Y.	106
Dickinson Henry, 66 and 68 Reade, N. Y.	106
Fisher Joseph S., 411 Commerce, Phila.	106
Fraser Peter A. & Co., Fulton, N. Y.	106
Moss F. W., 8 John, N. Y.	106
Sanderson Bros. & Co., 16 Cliff, N. Y.	106
Spears & Jackson, 36 Chambers, N. Y.	106
FILES, Manufacturers of.	
Barnett G. & H., 41 and 43 Richmond, Phila.	106
McCauley & Bro., 1122 and 1784 N. 4th, Phila.	106
Nicholson File Co., Providence, R. I.	106
Wheeler, Clemons & Co., Middletown, N. Y.	106
FIRE ARMS, Manufacturers of.	
Robinson M. W., 79 Chambers, N. Y.	106
Schuyler & Daly, 54 Chambers, N. Y.	106
Spies, Kram & Co., 276 Broadway, N. Y.	106
FIRE BRICK, Makers of.	
Hall A. & Son, 24 Albany, N. J.	106
Kreischer B. & Son, 54 Goerck, N. Y.	106
Newkumet Adam, 1871 N. Front, Phila.	106
Palmer, Newton & Co., Albany, N. Y.	106
Watson John R., Perth Amboy, N. J.	106

Fluting Machines.	
Meiers Mfg. Co., 80 Centre, N. Y.	20
Flint and Emery Paper and Cloth.	
Cowdin Mfg. Co., 114 Chambers, N. Y.	11
Gage Cocks and Damper Regulators.	
Nairn & Keller, Baltimore, Md.	10
Galvanized Iron.	
Lefferts Marshall Jr., 91 Beekman, N. Y.	4
Glass, Importers of.	
Downing A. C. & Co., 31 Beekman, N. Y.	5
Governors.	
Shure Governor Co., Bethlehem, Pa.	31
Grindstones.	
McDermott J. & Co., Cleveland, O.	18
Shepard Sidney & Co., Buffalo, N. Y.	6
Wood Vetter R., 268 Front, N. Y.	6
Gunpowder, Makers of.	
Kneeland F. L. (Dupont) 70 Wall, N. Y.	32
Lafin & Rand Powder Co., 21 Park Row, N. Y.	32
Hammers, etc., Manufacturers of.	
Emmet Hammer Co., Brooklyn, E. D. N. Y.	3
Hammond C. & Son, 13 N. 5th, Phila.	3
Minot & Co., Oliver, Rochester, N. Y.	22
Nelson Tool Works, 157 E. 2d, N. Y.	10
Handles, Hoes, Rakes, etc.	
Smith J. W. H. & Co., Charlotte, Mich.	15
Hardware, Brass and Galvanized.	
Tiebout, S. & Co., 292 Canal, N. Y.	2
Hardware, Communal Merchants.	
Fernald & Sise, 100 Chambers, N. Y.	12
Green R. M., 100 Chambers, N. Y.	12
Graham & Haines, 28 Chambers, N. Y.	12
Walbridge Geo. B., 55 Chambers, N. Y.	12
Hardware Dealers.	
Lloyd, Supple & Walton, 635 Market, Phila.	10
Louderback, Gilbert & Co., 38 Chambers, N. Y.	10
Shepard Sidney & Co., Buffalo, N. Y.	10
Turner, Seymour & Judd, 64 Duane, N. Y.	16
Hardware Importers.	
Beam & Murray, 101 Duane, N. Y.	27
Field Alfred & Co., 41 John, N. Y.	11
Hilger & Sons, 40 Chambers, N. Y.	11
King B. & J. W., 80 Chambers, N. Y.	11
E. Frith, 16 Cliff, N. Y.	11
Long & Co., 101 Duane, N. Y.	11
Van Wart & McCoy, 43 Chambers, N. Y.	11
Turner H. A., 31 Chambers, N. Y.	11
Hardware Manufacturers.	
Blade Mfg. Co., 101 Duane, N. Y.	28
Durrie Horace, 9 Chambers, N. Y.	28
Enterprise Mfg. Co., Phila.	28
Hart, Rice & Co., 101 Duane, N. Y.	28
Kellogg Wm. P. & Co., Troy, N. Y.	23
Lane, Gale & Co., Troy, N. Y.	23
Many F. L. & Marshall, 45 Warren, N. Y.	23
Middleton Tool Co., 12 Chambers, N. Y.	23
Miller's Falls Mfg. Co., 75 Beekman, N. Y.	23
Pratt & Co., Buffalo, N. Y.	23
Providence Tool Co., 11 Warren, N. Y.	14
Tanner & Hiram Mfg. Co., 101 Duane, N. Y.	14
Schwartz Mfg. Co., 37 Reade, N. Y.	16
Shattuck W. F. & Co., 18 Chambers, N. Y.	16
Turner, Seymour & Judd, 64 Duane, N. Y.	16
Turner Mfg. Co., 55 Chambers, N. Y.	16
Williams, White & Church, 101 Duane, N. Y.	16
Wilson Mfg. Co., 31 Chambers, N. Y.	25
Hardware Specialties.	
Riddle Mfg. Co., 78 Chambers, N. Y.	28
Sease John, 101 Duane, N. Y.	28
Heaton David, Providence, R. I.	28
Holton F. G. & Co., 121 Walnut, Cincinnati, O.	28
Louderback, Gilbert & Co., 38 Chambers, N. Y.	28
Semple, Birge & Co., St. Louis.	28
Helve Hammers, Makers of.	
Bradley Mfg. Co., Syracuse, N. Y.	29
Hemp Piston Packing.	
Candle John Co., 284 Mount Ave., Phila.	25
Holting Engines, Makers of.	
Otis Bros. & Co., 348 Broadway, N. Y.	9
Todd & Hafferty Machine Co., 10 Barclay, N. Y.	9
Horse Hay Forks and Fixtures, Makers of.	
Wells A. & Co., Phila.	36
Horse Nails, Makers of.	
Assable Horse Nail Co., 35 Chambers, N. Y.	8
Brundage & Co., Middlebury, N. Y.	8
Globe Nail Co., Boston, Mass.	10
Globe Nail Co., Buffalo, N. Y.	10
Putnam & Co., 101 Duane, N. Y.	26
Horse Shoes, Makers of.	
Burden Iron Works, Troy, N. Y.	4
Hubs and Spokes, Mfrs. of.	
Gleason J., 2nd and Diamond, Phila.	12
Hydraulic Jacks.	
Dodge Richard, 14 Columbia, N. Y.	1
Ice Cream Freezers, Makers of.	
Torry E. S. & J., 106 Fulton, N. Y.	25
Insurance, Boiler.	
Hartford Steam Boiler and Inspection Co.	31
Iron Brackets.	
Boytton Geo. A., 70 Wall, N. Y.	6
Hazard & Jones, 212 Pearl, N. Y.	6
Pettit Wm. H., 71 Wall, N. Y.	6
Iron, Concrete, Manufacturers of.	
Corrugated Metal Co., East Berlin, Conn.	4
Moseley Iron Bridge and Roof Co., 5 Dey, N. Y.	4
Iron, Charcoal, Warm or Cold Blast.	
Quincy John W., 26 William, N. Y.	6
Iron Commission Merchants.	
Blackiston & Cox, 532 Walnut, Phila.	5
Hand Jas. C. & Co., 614 and 616 Market, Phila.	16
Kooper W. Graham, 419 Wall, Phila.	16
Malin Bros., 228 Dock, Phila.	16
Iron, Pipe, Importers of.	
Williamson James & Co., 69 Wall, N. Y.	1
Iron Dealers.	
Abel Brothers, 190 South, N. Y.	4
Borden & Lovell, 70 and 71 West, N. Y.	4
Cleveland, Brown & Co., Cleveland, O.	4
Coddington T. B. & Co., 101 Duane, N. Y.	4
Conkling & Huester, 90 Market Slip, N. Y.	4
Fisher Lord & Co., 149 Greenwich, N. Y.	4
Fisher Lord & Co., 149 Greenwich, N. Y.	4
Gardner Wm., 575 Grand, N. Y.	4
Kimball Bros. & Co., Chicago.	4
Kirkland & Gilson, 22 and 24 Water, N. Y.	4
Hart G. A., 208 Walnut, Phila.	4
Jackson & Chase, 208 and 209 Franklin, N. Y.	4
Johnson B. F., 45 and 46 Reade, N. Y.	4
Matthews Chas. W., 133 Walnut, Phila.	4
Packard, Goff & Co., Youngstown, O.	4
Pettice & Mann, 228 and 229 South, N. Y.	4
Pierpont & Co., 24 Broadway, N. Y.	4
Pope Thos. J. & Bro., 222 Pearl, N. Y.	4
Quincy John W., 26 William, N. Y.	4
Richards D. W. & Co., 32 Market, N. Y.	4
Smith Gam'l G. & Co., 342 Pearl, N. Y.	4
Tanner A. & Sons, 25 and 26 West, N. Y.	4
Williamson James & Co., 69 Wall, N. Y.	4
Whitney Alfred R., 38 Hudson, N. Y.	4
Iron, Manufacturers of.	
Blackiston & Cox, 532 Walnut, Phila.	4
Britannia Iron Works, Middlebury, Eng.	4
Burden Iron Works, Troy, N. Y.	4
Cleveland Rolling Mill Co., Cleveland, O.	4
Coffin Wm. E. & Co., 8 Oliver, Boston.	4
Ellis W. R. & Co., 11 Battery, Boston.	4
Evergreen, Graft & Co., Newburgh, N. Y.	4
Fulton S. & Co., 412 Walnut, Phila.	4
Jones & Laughlin, Philadelphia, Pa.	4
Leonard John, 421 W. 4th, N. Y.	4
Lynchburg Iron Works, Lynchburg, Va.	4
Milwaukee Iron Co., Milwaukee, Wis.	4
Niles Iron Co., Niles, Mich.	4
New Haven Rolling Mill Co., New Haven, Ct.	4
Old Dominion Iron & Nail Works Co., Richmond, Va.	4
Oxford Iron Co., 31 Washington, N. Y.	4
Phoenix Iron Co., 410 Walnut, Phila.	4
Rowland Wm. & Harvey, Phila.	4
Stirling & Co., 41 Pine, N. Y.	4
Iron, Swedish, Importers of.	
Jessop William, 69 William, N. Y.	12
Page Ewd. & Co., Boston, N. Y. and Phila.	12
Leaf Lathier, Manufacturers of.	
Boyle W. H., 400 Liberty, N. Y.	12
Lathes, Manufacturers of.	
Dietz R. E. (Tubing) 54 and 56 Fulton, N. Y.	35
Howard Morris, 101 Duane, N. Y.	35
Shepard Sidney & Co., Buffalo, N. Y.	35
Lawn Mowers, Manufacturers of.	
Frederick Coldwell Mfg. Co., Newburgh, N. Y.	29
Lead and Tin Lead Pipe, etc., Mfrs.	
Coldwell Lead Co., 113 Centre, N. Y.	2
Levers, Makers of.	
Bohannon Wilson, Broadway and Kosworth, Brooklyn, E. D.	2
Levers, Makers of.	
Brundage & Co., Middlebury, N. Y.	2
Norwich Lock Co., Norwich, Conn.	2
Romer & Co., Newark, N. J.	2
Snyder & Co., 101 Duane, N. Y.	2
Trenton Lock Co., 40 Warren, N. Y.	2
Yale Lock Mfg. Co., 28 Broadway, N. Y.	2
Lining, Manufacturers of.	
Billings & Spencer Co., Hartford, Conn.	34
Phillips Lending Mch. Co., 63 Brecker, N. Y.	34
Pratt & Whitney Co., New Hartford, Conn.	34
Mason V. W. & Co., Providence, R. I.	34
Chapin Machine Co., New Hartford, Conn.	34
Pratt & Whitney Co., Hartford, Conn.	34
Rollstone Machine Works, Fitchburg, Mass.	34
Sargent Wm. & Co., Newburgh, N. Y.	34
Watson Andrew, 337 Dickinson, Phila.	34
Whitehill, Smith & Co., Newburgh, N. Y.	34
Machine Screws, Makers of.	
American Screw Co., Providence, R. I.	15
Lyons & Beiers Mfg. Co., Williamsburg, N. Y.	15
Machine Tools.	
Demarst, Joyce & Co., Brooklyn, E. D.	9
Eckel James, 428 Canal, N. Y.	9
Heald & Sons, Barro, Mass.	9
Machine Tools, Makers of.	
Brundage & Co., Middlebury, N. Y.	9
Freeland Tool Works, 555 and 560 W. 34th, N. Y.	9
Freeland Tool Works, 555 and 560 W. 34th, N. Y.	9
Linchon Geo. C., 101 Duane, N. Y.	9
Star Tool Co., Providence, R. I.	9
Machine Tools and Lathes.	
Churchill & Co., 101 Duane, N. Y.	14
Machine Tools and Lathes.	
Carr, Crawley & Deane, 37 Arden, Phila.	6
Heart Cutters, Makers of.	
Valcan Mfg. Co., 61 Warren, Chambers, N. Y.	10
Whittemore D. H., Worcester, Mass.	10

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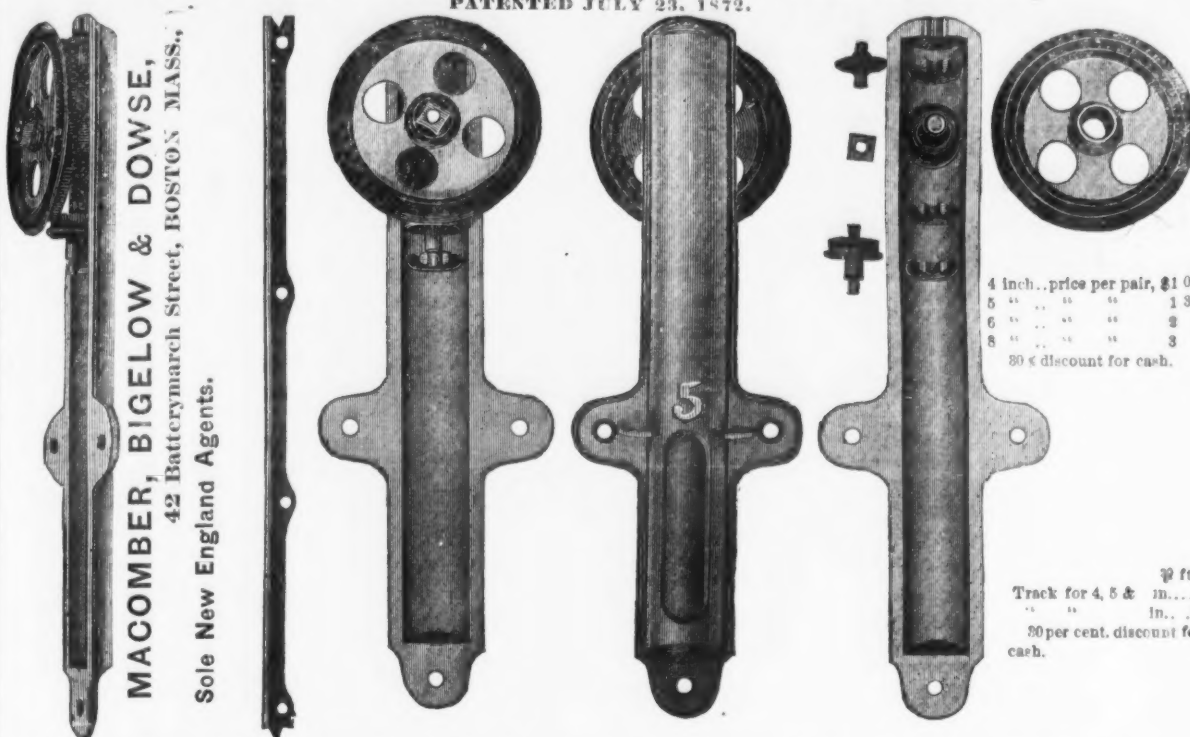
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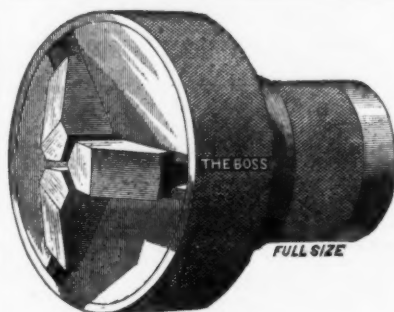
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3d.—By thus causing the sheave to run true, the doors are always held up **Close to the Frame**, and maintain a close joint around it.
4th.—The sheave has but one flange, there being a lower friction wheel provided with a flange which extends out under the face of the sheave and bears against the
outer side of the track, which takes the place of the extra flange in the sheave, thus doing away with the **grooved sheave** which always grinds or breaks
5th.—**IT CAN NEVER RUN OFF THE TRACK.**
6th.—It is the **easiest running** Hanger made, our 5 in. answering the same as 6 in. of the checkback and ordinary makes.
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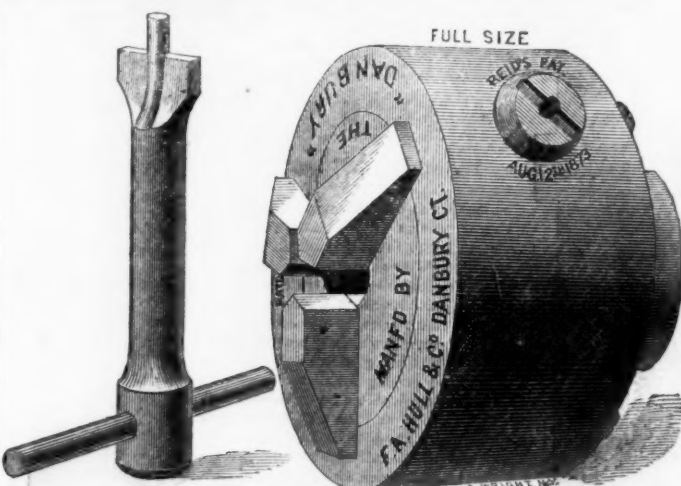
is warranted to be the best and most perfect made Chuck in use. It
holds from 0 to three-eighths inch, and is truly the Boss Chuck.
Every piece is made of Forged Steel, and finished to a Gauge. Give
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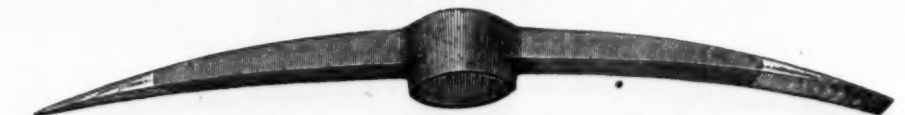
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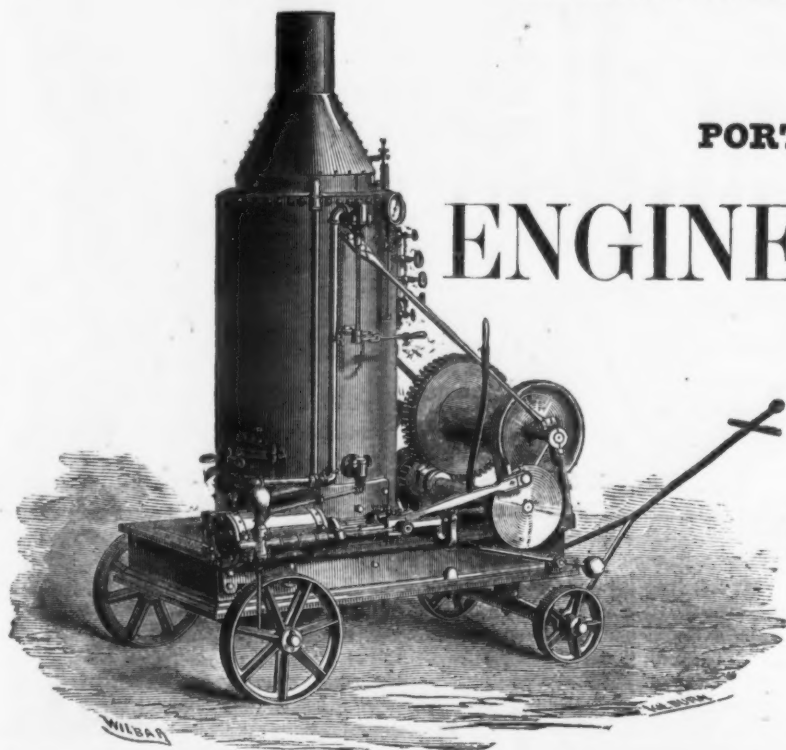
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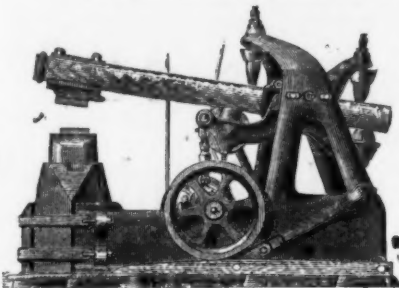
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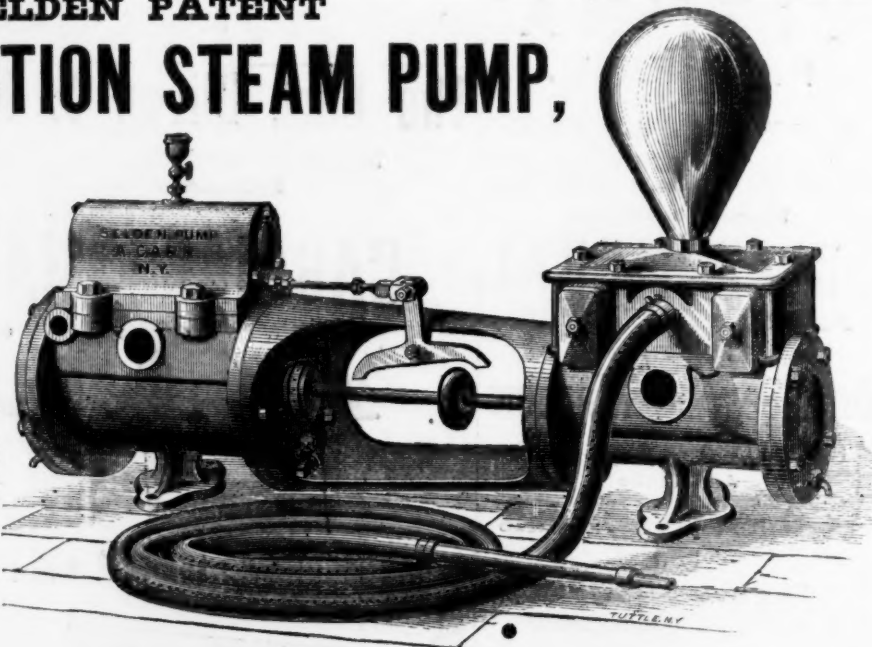
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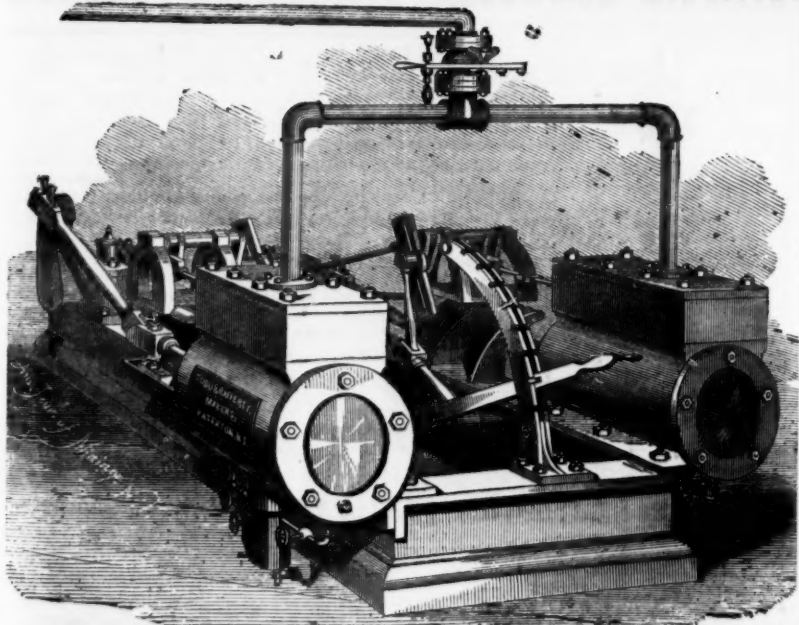
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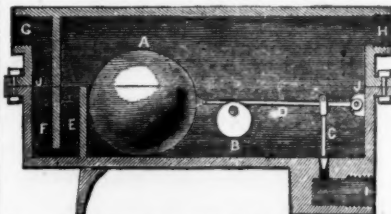
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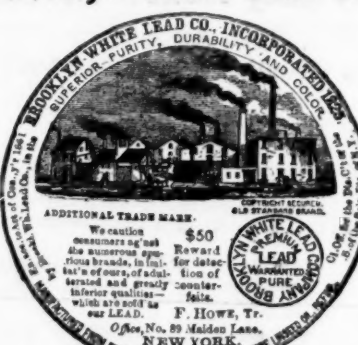
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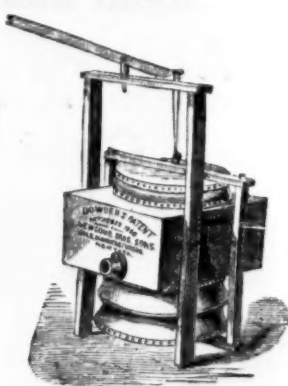
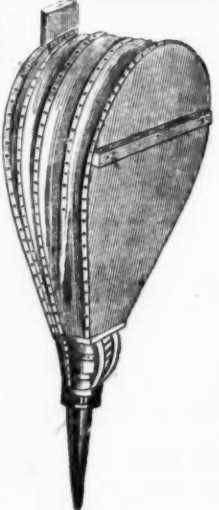
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Royal, No. 1, 4 1/2 inch Rollers.....dis 10 to 15

Hammer and Hatchets.....dis 10 to 15

Yerkes & Plumb's.....dis 10 to 15

Hammond & Son's.....dis 10 to 15

Beatty's.....dis 10 to 15

Hinges.—Strap and.....dis 30 to 40

Donney's No. 1 Gate.....dis 25 to 30

No. 2 and 3.....dis 30 to 35

Horse Nails.....Nos. 6 7 8 9 10

Anchors.....dis 25 to 30

Globe.....dis 25 to 30

Brundage.....dis 25 to 30

Patman.....dis 25 to 30

On Ausable, Globe and Brundage 1000 lb. lots.....dis 3 50

Knobs.—Door (regular manufacture).....dis 40 to 45

Porcelain and Mineral.....dis 40 to 45

Locks and Latches.—Rim and Mortise.....dis 40 to 45

Till and Capboard.....dis 40 to 45

American Padlocks.....dis 40 to 45

Trunk Locks.....dis 40 to 45

Thumb and Hoggens Latches.....dis 40 to 45

Mattresses.—Long and Short Cutter.....dis 15 to 20

Western Pattern.....dis 15 to 20

Pennsylvania Pattern.....dis 15 to 20

Molasses Gates.....dis 15 to 20

Enterprise Mfg. Co.'s Measuring Faucets.....dis 30 to 35

Steebings' Gates.....dis 30 to 35

Lincoln's.....dis 30 to 35

Lauders, Fray & Clark's Petroleum.....dis 10 to 15

Taylor's Petroleum Faucets.....dis 20 to 25

Rabes.—Cast Steel Garden.....dis 30 to 35

Wood Head Iron Teeth.....dis 30 to 35

Rules.—Stanley Rule and Level Co.....dis 60 to 65

Stern's and Hubbard's.....dis 60 to 65

Squares.—Steel and Iron, new list.....dis 10 to 15

Saw.—Dillon's Cross Cut.....dis 12 to 15

Dillon's Hand.....dis 12 to 15

W. McNeice's H.V. Cross-Cut & Circle, new list, dis 12 to 15

Borlinton's Lightning, new list.....dis 30 to 35

Sorensen and.....dis 30 to 35

Borlinton's Plain Rack, list Feb. 1873.....dis 30 to 35

Back Strap.....dis 30 to 35

Oliver Ames & Sons.....dis 30 to 35

Bradley Shovel Co.....dis 30 to 35

Saw Irons.—Reading (piano face).....per lb. 4 1/2

Companee (collected face).....dis 30 to 35

Steel Polish.—Gross, 35 to 40

Only.....dis 30 to 35

Scissors.—Gross, 35 to 40

Clipper No. 10.....dis 30 to 35

Common Scissors.....dis 30 to 35

Revs.—Iron.....dis 30 to 35

Brass.....dis 30 to 35

Spoons.—24 and 26, Rogers Bros.....new list dis 30 to 35

Britannia Spoons.....dis 40 to 45

German Silver.....dis 40 to 45

Try Squares.—Winterbottom.....new list dis 10 to 15

Rule and Level Co.....dis 40 to 45

Willa Thrall, No. 2.....dis 30 to 35

Dillon's No. 2.....dis 30 to 35

Tacks, Acc.—Half Weight Tacks.....dis 6 1/2

Cloot and Finishing Nails.....dis 6 1/2

Taps.—Genuine Onida—Newhouse list.....dis 24 to 25

Wrenches.—Coe's Genuine.....dis 30 to 35

Coe's Imitation Wrought Bar.....dis 30 to 35

Malleable Bar.....dis 30 to 35

(Kellogg's) Malleable Bar.....dis 30 to 35

Tifts Pattern.....dis 30 to 35

Wire.—No. 0 to 15.....dis 30 to 35

No. 10 to 20.....dis 30 to 35

Coppered to 12.....dis 1 1/2 to 2 1/2

Tinned Broom Wire.....dis 15 to 20

Table and Back Flaps.....dis 25 to 30

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Steel.

THREE
1st CLASS PRIZE MEDALS.
CLASSES 1, 21, 22,
Great Exhibition of Industry,
LONDON, 1851.

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SOCIETY OF ARTS & INDUSTRY,
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PRIZE MEDAL, CLASS 1st
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EXHIBITION OF INDUSTRY
PARIS, 1855.

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SUCCESSORS TO
SAM'L COCKER & SON,
(Established 1752.)
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MANUFACTURERS OF
CAST, SHEET, AND BLISTER STEEL, OF EVERY DESCRIPTION.
BEST CAST STEEL WIRE, ADAPTED SPECIALLY FOR MECHANICAL PURPOSES;
Also for ROPES, NEEDLES, FISH HOOKS, PINS, CRINOLINE, &c.

BEST CAST STEEL FILES, SAWS, EDGE TOOLS,
HACKLES, GILLS, CARD CLOTHING, CARD TEETH, HACKLE AND GILL PINS,
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MOSS & GAMBLE SUPERIOR C. S. "FULL WEIGHT" FILES,
Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

WARRANTED CAST STEEL, especially adapted for DIES and TURN-
ING TOOLS, DRILLS, COLD CHISELS,
(PUNCHES and all kinds of MACHINISTS' TOOLS.
(Celebrated Improved Mid Centre Cast Steel, for Taps, Reamers, and Milling Tools,
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STEEL

For Tools, Cutlery, Saws, Files, Augers, Gimblets, &c.; Sheet Cast Steel for
SPRINGS AND STAMPING COLD;

ALSO THE CELEBRATED

DOG BRAND FILES,

Unsurpassed, if equalled in quality.

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IMPORTERS OF FILES,

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Sole Manufact'rs of **"CHOICE"** Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

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**Cast and Double Shear
STEEL,**

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table, Carving,
Butcher and Shoe Knives, Turning Tools, Dies, Files, Clock or other Springs,
Saws and Tools of every variety.

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*In calling the attention of consumers of Steel to
any of the various above enumerated, we would respectfully assure
them of our ability to supply an article, that cannot be equalled in
quality, temper, and adaptability in all respects to the various purposes
for which it may be required. Half a century of practical expe-
rience in all departments of Steel manufacture, a long established
reputation in England, and the Continent of Europe, and in the United
States principally of this Country, encourage us to select a minor
kind of our Steel for the above or other purposes for which a first
class material in quality, temper, and durability is needed.*

G. SANDERSON & CO.,

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Bailey Street and
Broad Lane Steel Works, SHEFFIELD, ENGLAND.

Particular attention is paid to quality and temper for

Files, Saws, Table and Pocket Cutlery, Augers, Shovels, &c.

ALSO STEEL of superior quality for Turning Tools, Taps, Dies, Drills, &c.
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Railroad Iron, Pig Iron, Merchant and Ship Iron,

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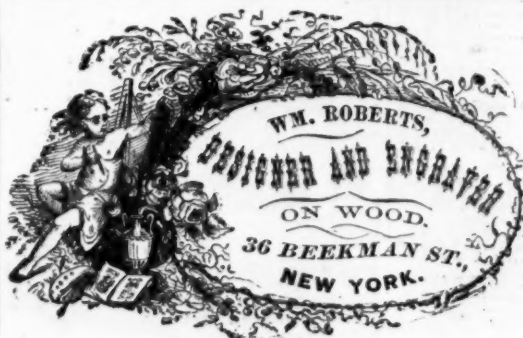
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Hammered and Rolled STEEL of every description

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EVERY DESCRIPTION OF EN-
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FIRST-CLASS WORK AT LOW
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CAST STEEL,

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All descriptions of Cast and German

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AXLES, STEEL TIRE,

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TIRE, TOE CORK, SLEIGH SHOE.

BLISTER & FLOW STEEL.

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Gunpowder.

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LAFIN & RAND POWDER CO.,

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SAFETY-FUSE at wholesale.

Steel.

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MANUFACTURERS OF ALL DESCRIPTIONS OF

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Best Refined Steel for Edge Tools.

PARTICULAR ATTENTION PAID TO THE MANUFACTURE OF STEEL FOR

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FOR LOCOMOTIVES, BOILERS AND FIRE BOXES,

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Trenton, N. J.,

Represented by COOPER, HEWITT & CO., 17 Burling Slip, New York,

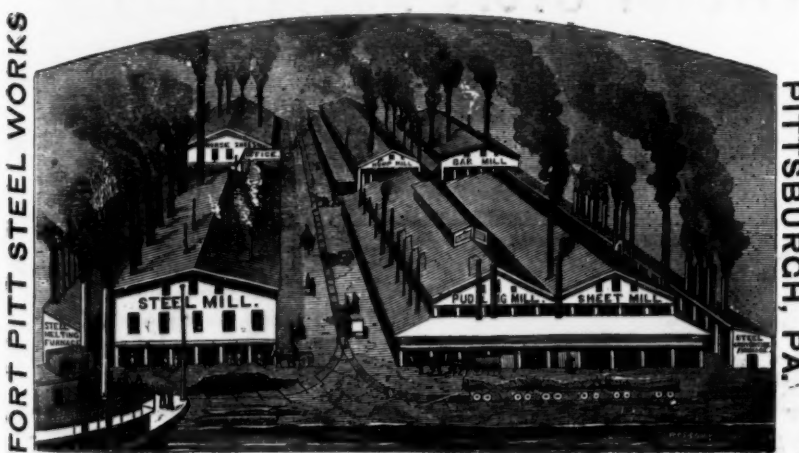
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New Style Testing Machines, all sizes,
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Parallel Crane Beams and Mortising
Machines.

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Agricultural Implements.—
Scythes—Dunn Edge Tools.....dis 25 c
Hay and Manure Forks—Otisgo extra C. S.....dis 25 c
Hoes and Garden Rakes—Jackson and O.....dis 25 c
Seythe Stones.....dis 25 c
Seythe and Bush Snathes.....dis 25 c
Harvest Rakes and Barley Forks.....dis 25 c
Revolving Horse Rakes.....dis 25 c
Handles—Fork and Shovel.....dis 25 c
Cradles—Nithington, Cooley & Co.....dis 40 c
—Genuine Morgan.....dis 40 c

Augers and Bits.—
Ives extra C. S.....dis 10 c
Jennings.....dis 10 c
Cook's.....dis 10 c

Axles.—Amoskeag Yankee.....dis 13 50
Amoskeag Crescent.....dis 14 00
Hunt's Yankee.....dis 14 00
Kennebec Yankee.....dis 12 00
Lippincott.....dis 13 00

—Crown.....dis 14 00
—Beveled.....dis 14 50
Jefford's Silver Steel.....dis 13 00
Kennebec Handled.....dis 11 00
Boy's Handled.....dis 12 00

Boils.—Carriage and Tire.....dis 10 12 1/2
Cast Barrel and Shovel.....dis 10 12 1/2
Wrought Iron Barrel.....dis 10 12 1/2

Butts.—Cast Fast Joint, Narrow.....dis 30 c
—Cast Fast Joint, Broad.....dis 40 c
—Loose Joint.....dis 40 c
—Pin, Reversible.....dis 40 c
—Silver Tipped.....dis 40 c
Wrought Narrow, Fast Joint.....dis 30 c
—Broad.....dis 30 c
—Loose Pin.....dis 30 c
—Table.....dis 30 c
—Brass.....dis 30 c
Garretson's Blind Butts, Wood.....dis 25 c
Parker's.....dis 25 c

Casters.—Iron Plate.....dis 25 c
—Steel Plate.....dis 25 c
—Porcelain Wheel Plate.....dis 25 c
—Iron Wheel Bed.....dis 25 c
Chisels.—Butcher's Tanged Firmer.....dis 25 c
—Long Farling.....dis 25 c
Wetherby Socket Framing.....dis 25 c
—Firmer.....dis 25 c
—Slicks.....dis 25 c

Coffee Mills.—
Box 55 Cast Steel.....dis 13 00
No. 10.....dis 13 00
No. 12.....dis 13 00
No. 14.....dis 13 00
No. 16.....dis 13 00
No. 18.....dis 13 00
No. 20.....dis 13 00
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No. 80.....dis 13 00
No. 82.....dis 13 00
No. 84.....dis 13 00
No. 86.....dis 13 00
No. 88.....dis 13 00
No. 90.....dis 13 00
No. 92.....dis 13 00
No. 94.....dis 13 00
No. 96.....dis 13 00
No. 98.....dis 13 00
No. 100.....dis 13 00

Cutlery.—American Table.....dis 25 c
—Pocket.....dis 25 c
Door Springs.—Torry.....dis 40 c
Boon's.....dis 40 c
Drawing Knives.—Wetherby Tool Co.....dis 50 c
—Ohio Tool Co.....dis 50 c
Files.—Butcher's.....dis 10 c
—Nicholson's.....dis 10 c
Hammers.—
Mauls.....dis 10 c
Mallets.....dis 10 c
Hatchets.—
Amoskeag Shingling.....dis 10 c
—Lath.....dis 10 c
—Solid Steel.....dis 10 c
Hinges.—Strap and Strap.....dis 10 c
Screw Hook and Strap, 9 to 12 in.....dis 10 c
Hook and Eye Hinges.....dis 10 c
Gate, No. 35, State.....dis 10 c
No. 3, In and Out.....dis 10 c
Bilant's Pat.....dis 10 c
Horse Nails.—Northwestern, ad.....dis 10 c
Globe, ad.....dis 10 c
Kettles.—Brass.....dis 10 c
Locks and Knobs.—
Norwalk Lock.....dis 10 c
—Brantford.....dis 10 c
—Woodruff Patent.....dis 10 c
—Stuffers.....dis 10 c
—Enterprise Patent.....dis 10 c
Nails.—10d to 6d.....dis 10 c
—Washita Sledge.....dis 10 c
—Hindostan No. 1.....dis 10 c
—Sledge.....dis 10 c
Picks and Mattocks.—Picks, railroad.....dis 10 c
Axe Finish.....dis 10 c
Picks, Coal, Axe Finish.....dis 10 c
Mattocks, L. C. Axe Finish.....dis 10 c
—S. C. Axe Finish.....dis 10 c
Grab Hoes, Axe Finish, No. 1.....dis 10 c
Pliers.—Ohio Tool Co., Bench.....dis 10 c
S. C. Bench.....dis 10 c
A. Howland & Co., Fancy.....dis 10 c
Bailey Patent Iron.....dis 10 c
Plane Irons, Butcher's.....dis 10 c
Rivets.—Iron, dia 1/2 to 1 1/2.....dis 10 c
—Copper, No. 7, net.....dis 10 c
—No. 10.....dis 10 c
Rules.—Stanley Rule and Level Co.....dis 10 c
—Hubbard & Currier Mfg. Co.....dis 10 c
Saw Irons.—Best A No. 1.....dis 10 c
—Copper Face Star.....dis 10 c
Sawpaper.—Wiggin & Stevens, No. 0 to 1 1/2.....dis 10 c
Sash Locks.—Champion.....dis 10 c
Hopkins & Dickinson.....dis 10 c
Judd's Patent.....dis 10 c
Corbin's Patent.....dis 10 c
Clark's Patent.....dis 10 c
Saws.—H. Diston & Sons.....dis 10 c
—Champion & Co.....dis 10 c
—M. A. & Co. X Cut.....dis 10 c
—Lightning Cut.....dis 10 c
—American Screw Co.....dis 10 c
—Blued Rd. Head.....dis 10 c
Shovels and Spades.—
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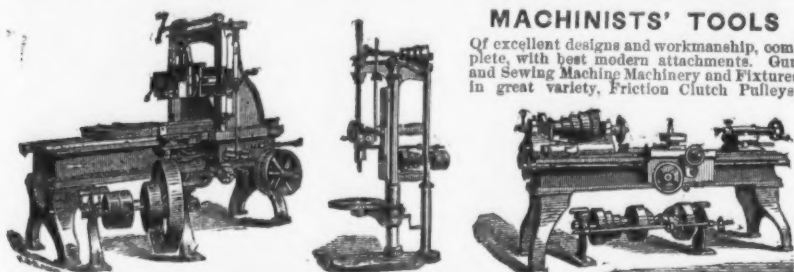
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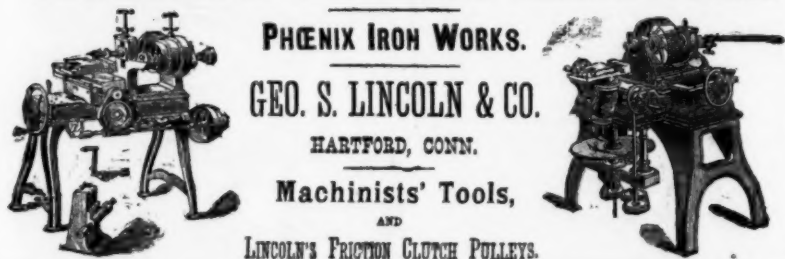
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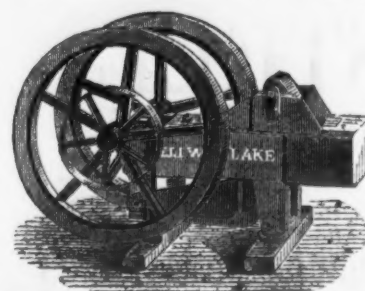
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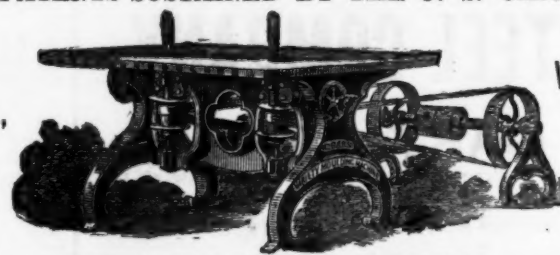
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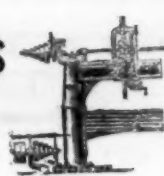
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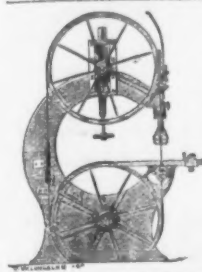
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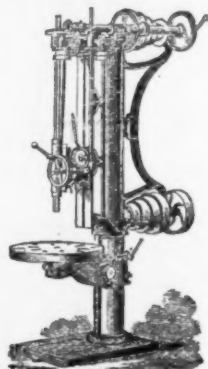
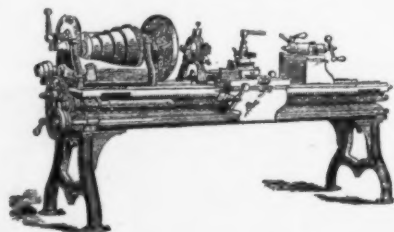
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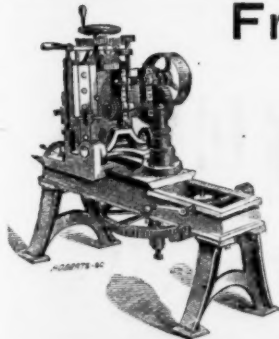
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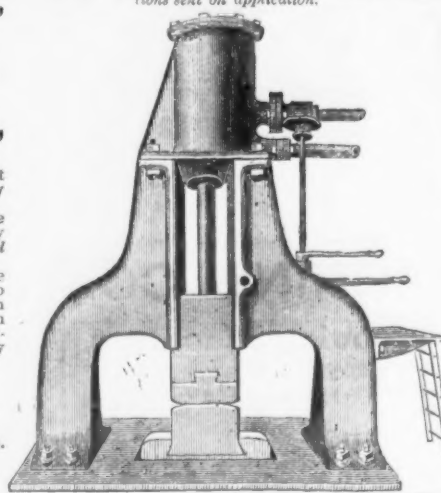
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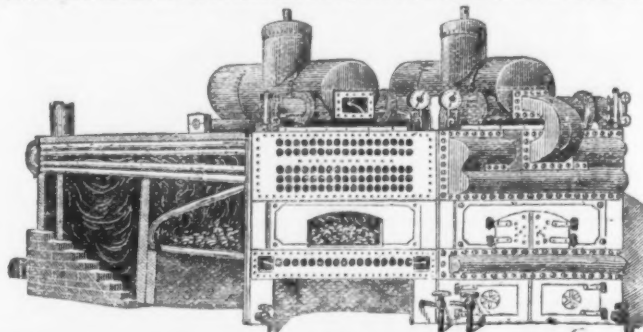
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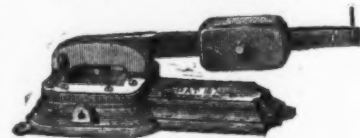
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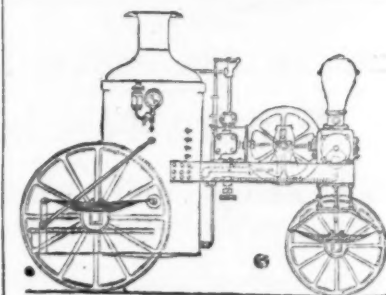
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